

ANNUAL REPORT

OF THE

BOARD OF WATER COMMISSIONERS

TO THE

COMMON COUNCIL OF THE CITY OF DETROIT,

TOGETHER WITH

THE REPORTS OF THE SECRETARY,

FOR THE YEAR ENDING DECEMBER 31, 1860.

DETROIT:

FREE PRESS MAMMOTH BOOK AND JOB PRINTING HOUSE

1861.

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EDMUND A. BRUSH, WILLIAM R. NOYES,
ALEXANDER D. FRASER, JULIUS D. MORTON,
JOHN V. RUEHLE.

EDMUND A. BRUSH,
PRESIDENT.
ROBERT E. ROBERTS,
SECRETARY.
BENJAMIN B. MOORE,
SUPERINTENDENT OF EXTENSION AND REPAIRS.
JOHN E. EDWARDS,
ENGINEER.
JACOB L. MUTH,
RESERVOIR KEEPER.

Are payable quarterly in advance, at the Office. Quarters commence on the first days of JANUARY, APRIL, JULY, and OCTOBER. If not paid during the first month of the quarter, a per centage will be added for collection; and, if not then paid promptly, on demand being made, the water will be shut off, and not again let on until arrearages, together with the expenses of shutting off and letting on are paid.

 OFFICE, — Corner of Larned and Bates Streets.



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Water Commissioners' Report.

OFFICE OF WATER WORKS,

DETROIT, Jan. 29, 1861.

To the Hon. the Common Council of the City of Detroit:

GENTLEMEN:—The Water Commissioners respectfully present their Annual Report for the year ending December 31st, 1860, together with the reports of the Secretary, to which we refer, for information in detail, relating to the several departments of the works.

The services of the Superintendent and Engineer were dispensed with on the first of September last, and the duties of such officer were distributed and performed by the other officers of the Board.

We report that we have made the past year a loan of \$50,000, at par, of the amount authorized to be loaned by an act of the Legislature.

All moneys received on loan by the Board, have been placed in Bank at the same rate of interest (7 per cent.) the Commissioners pay. During the period of disbursement of the money in the construction of the works the Board have received as interest the sum of \$55,112.69.

In our last annual report we stated that the new pumping engine was nearly completed. The contractors have continually kept a force employed in setting it up during the entire year past. It is set up; the boilers are set, and the steam attachments are made, but the contractors have not yet offered it for acceptance. The long delay in bringing this engine into service has been a source of great anxiety to the Commissioners. The Engineer in charge of setting up the engine, having completed his work, is now at the east, consulting his employers in regard to getting the same in operation.

The ordinary receipts of the Board the past year amount to the sum of \$54,931.17, which, with the amount received by loan of \$50,000, makes the total sum of \$104,931.17; the whole amount of the expenditures of the Board for same time was \$78,971.37, and the balance now on hand is \$61,692.56. The whole amount of liabilities incurred by the Board is \$650,000, and the amount expended by them for construction is \$595,783.45.

Three thousand nine hundred and seventy-seven feet of iron pipes, and two miles and one thousand one hundred and forty-eight feet of wooden pipes have been laid down during the past year. The total pipeage of the city is now sixty-three miles, four thousand seven hundred and sixty-nine feet, of which thirty-eight miles, four thousand eight hundred and sixty-seven feet are iron, and twenty-four miles, five thousand one hundred and eighty-two feet are wood. Eight additional Fire Hydrants have been set up. The total number now in use is two hundred and forty-five. Nine additional street reservoirs have been connected and supplied with water from the works, making the whole number now supplied one hundred and eleven.

E. A. BRUSH,	}	<i>Commissioners.</i>
A. D. FRASER,		
J. D. MORTON,		
W. R. NOYES,		
J. V. RUEHLE,		

Annual Report of the Secretary,

FOR THE YEAR ENDING DECEMBER 31, 1860.

OFFICE OF WATER WORKS,

DETROIT Jan. 29, 1861.

To the Board of Water Commissioners of the City of Detroit :

GENTLEMEN:—The undersigned respectfully submits the following report for the year ending December 31st, 1861.

The whole number of gallons of water distributed during the past year, is 870,036,451, being an increase over the quantity distributed last year, of 87,923,864 gallons.

The number of United States standard gallons of water distributed during the year, and the average daily number of gallons distributed, in the different years from 1852 to 1860, inclusive, is as follows.

YEARS.	YEARLY. NO. GALLONS.	DAILY. NO. GALLONS.
1852.....	235,940,271	963,022
1853.....	303,531,743	831,594
1854.....	376,265,126	1,030,863
1855.....	542,807,364	1,487,143
1856.....	692,124,305	1,891,050
1857.....	697,090,523	1,909,837
1858.....	718,091,207	1,981,071
1859.....	782,112,587	2,142,774
1860.....	870,036,451	2,383,661

The average daily distribution of water the past year, was 2,383,661 gallons. Assuming the population of the city to be 46,835, as given by the United States Census, the average daily distribution of water to each inhabitant would be $50\frac{3}{4}$ gallons. But it is generally believed, from estimates based on the number of families, the school census of children, and the number of votes polled, that the population of the city is much greater than that given by the United States Census, and estimating by the number of votes polled at the last November election, on the ratio of votes to the population of other cities, the population of Detroit may fairly be set down at 60,000. This would make the average daily distribution of water to each inhabitant $39\frac{3}{4}$ gallons.

ENGINE HOUSE.

Engine No. 1—Non-condensing, direct action; cylinder, $12\frac{1}{2}$ inches bore; 6 feet stroke of piston; driving a double acting force pump, 12 inches bore and 6 feet stroke. The pump to this engine is not in order, and the engine has not been run but a few hours during the past year.

Engine No. 2—and pump of similar construction; cylinder, $20\frac{1}{2}$ inches bore, has been run 5719 hours and twenty minutes, during the year, being an average of 15 hours and 40 minutes per day.

Strokes of pump, Engine No. 2, - - - - -	9,607,334
Cords of wood consumed, - - - - -	1,380
Tons of Coal consumed, - - - - -	427
Average engine duty of Engine No. 2:—Pounds raised	
one foot high with 100 pounds of coal consumed from	
January 1st, to October 16th,* - - - - -	37,989,949
Average effective duty pounds raised as above, - - -	34,111,937

The Montgomery boilers, and the heater in the old engine house, which had been in constant daily use for the past eleven years, entirely failed, and a steam connection was made from the new boilers to Engine No. 2, with the consent of the contractors for new engine. This connection was completed, and the new boilers were brought into use, on the 16th of October last, and their use has been continued

*The boilers to this Engine failed at this time, and the new boilers were used, which leaked badly, consuming an unusual quantity of coal. The duty from that time is not here given.

up to this time. These boilers have, during the time of their use, leaked so badly that it has been with difficulty that the fires were kept up, and caused a material increase of the cost of pumping the supply of water. It being necessary, under any circumstances, to have a reserve engine; a new boiler is now being made to take the place of the Montgomery boilers, which will in a short time be in its place, when the further use of the new boilers will be discontinued, and the expense of pumping brought back to below its original figure. Engine No. 1 will also be repaired and again brought into service.

SERVICE-COCKS, REPAIRS OF STREET PIPES, &c.

The number of connections made with the distribution pipes, is as follows :

One inch service-cocks, - - - - . - -	23
Five-eighths of an inch service-cocks, - - - - . -	130
Taps with the wooden logs, - - - - . - -	159
	<hr/>
Total,	312

The work accomplished by repairers is as follows :

Hydrants shut off for leaking and to be repaired, - - -	604
Hydrants shut off for non-payment and vacant, - - -	163
Water let on to Hydrants, - - - - - - -	295
Hydrants found running and closed, - - - - -	31
Leaks in the wooden logs repaired, - - - - -	50
Leaks in the joints of iron pipes repaired, - - - -	21
Iron Branch broke and replaced with new, - - - -	1
Street Reservoir Valves taken up and replaced with new, -	2
Street Reservoir Valves repaired, - - - - -	5
Street Reservoir Valves found running and closed, - -	24
Fire Plugs repaired, - - - - -	5
Fire Plugs taken up, - - - - -	1
Fire Plugs taken up and replaced with new, - - - -	4
Fire Plugs removed to curb line, - - - - -	5
Fire Plugs found running and closed, - - - - -	123
Stop-cock boxes fitted to grade, - - - - -	20
Stop-cocks repaired, - - - - -	22
Stop-cocks taken up and replaced with new, - - - -	1
Stop-cock box taken up and replaced with new, - - -	1

Caps put on to reservoir gates to replace those stolen,	4
Water meters taken out,	2
Iron pipes lowered to grade, made necessary by paving the streets,	559 feet.
Wooden logs lowered,	445 feet.

In addition to the above the repairers are almost daily required to visit premises and make some trifling adjustment of hydrants, or inform the occupants what is required to be done.

DISTRIBUTION.

IRON PIPES.

The location, length of lines, and size of iron pipes laid during the past year, is as follows:

LOCALITY.	Inches Diameter.	Feet.	Feet.
At the Wharf,	24	110	241
At the New Reservoir,	24	70	
At the New Engine House, for pump main,	24	61	
At the Wharf,	12	203	203
In St. Antoine St., from Marion to Watson Sts.,	8	1550	1595
At the Wharf,	8	45	
In St. Antoine St., from St. Lawrence to Marion Sts.,	6	738	760
At the Wharf,	6	22	
Across Third St., between Abbott and Howard Sts.,	4	61	1028
In alley, bet. Fort and Congress Sts., east of Beaubien St.,	4	235	
In Russell St., from Watson to Mary Sts.,	4	450	
In Whitney St., east of St. Antoine St.,	4	26	
In Marion St., east of St. Antoine St.,	4	26	
In Wilkins St., east of St. Antoine St.,	4	26	
In Jay St., east of St. Antoine St.,	4	25	
To connect Fire Plugs,	4	179	
To connect Street Reservoirs,	3	150	150
Total,			3977

The total amount of iron pipe in use is as follows:

INTERIOR DIAMETER.	FEET.
30 inches,	327
24 "	14,384
20 "	507
Carried forward,	15,218

Brought forward,	-	-	15,218
18 inches,	-	-	60
16 "	-	-	1,525
12 "	-	-	528
10 "	-	-	17,013
8 "	-	-	14,704
6 "	-	-	24,104
4 "	-	-	116,003
3 "	-	-	16,004
2 "	-	-	308

Total, 205,507=38 miles, 4867 ft.

WOODEN LOGS.

The location, length of lines, and size of wood distribution pipes, laid during the past year, is as follows:

LOCALITY.	FEET.	FEET.
THREE INCHES INTERIOR DIAMETER.		
In Marion St., from St. Antoine to Hastings Sts.,.....	580	4985
In Wilkins St., from St. Antoine to Hastings Sts.,.....	580	
In Bagg St., east from Park St.,.....	240	
In Alley, betw. Elizabeth and Adams Avenue, west of Cass St.,	294	
In Alley, between Woodward Avenue and Griswold St., south of State St.,.....	256	
In Elmwood Avenue, from Jefferson Avenue to Clinton St.,....	2350	
In Elmwood Cemetery Grounds,.....	195	
In Fort St., across May's Creek,	390	
To connect Street Reservoirs,.....	100	
TWO AND ONE-FOURTH INCHES INTERIOR DIAMETER.		
In Fifth St., between Fort and LaFayette Sts.,.....	98	6723
In New Reservoir Grounds,.....	421	
In Lafferty St., north from Fort St.,.....	526	
In Woodbridge St., from centre Lafontaine Farm to the west line of Stanton farm,	800	
In Whitney St., from St. Antoine St. to Hastings St.,.....	580	
In Marion St., east from Beaubien St.,.....	230	
In Jay St., from Orleans St. to St. Aubin St.,.....	980	
In Adelaide St., east of Woodward Avenue,	237	
In Woodbridge St., east of Orleans St.,.....	465	
In High St., east of Rivard St.,.....	280	
In St. Lawrence St., east of Prospect St.,.....	400	
In Macomb St., east of St. Aubin St.,.....	580	
In Elmwood Cemetery Grounds,.....	710	
In Orchard St., west from Third St.,.....	286	
In Alley north from Sibley St., between Park and Clifford Sts.,	130	
Total,		11,708

Two miles, and one thousand one hundred and forty-eight feet.

The pipe laid in Elmwood Cemetery was laid at the expense of the Trustees, and paid for by them.

There have been disconnected 921 feet of wooden logs which had become defective; of these 491 feet were laid by Jackson and Sutton, in 1840 and 1841—and 430 feet by some of the Superintendents, between the years 1841 and 1852.

The whole amount of wooden logs now in use is as follows :

Laid by Jackson and Sutton, in 1840 and

1841, - - - - - 22,779 feet.

Laid by the several Superintendents and

others, between the years 1841 and

1852, - - - - - 19,917 “

Laid by the Water Commissioners since

1857,

3 inches interior diameter, - - 43,585 “

2¼ “ “ “ - - 45,621 “

Total, 131,902=24 miles 5,182 ft.

Total pipeage—Iron pipe, - - - - - 38 miles 4,867 feet,

Wooden pipe, - - - - - 24 “ 5,182 “

Total, 63 miles 4,769 feet.

FIRE HYDRANTS.

In addition to the Fire Hydrants mentioned in the last Annual Report, eight hydrants have been set up during the past year, as follows :

On the S. W. corner of St. Antoine and High streets.

On the S. W. corner of St. Antoine and Napoleon streets.

On the S. E. corner of St. Antoine and Marion streets.

On the S. E. corner of St. Antoine and Bronson streets.

On the S. E. corner of St. Antoine and Division streets.

On the S. W. corner of St. Antoine and Whitney streets.

On the S. E. corner of St. Antoine and Wilkins streets.

On the N. W. corner of Russell and Mary streets.

The whole number of Fire Hydrants now in use, is 245.

STREET RESERVOIRS.

Nine Street Reservoirs have been connected and supplied with water from the works during the past year, as follows :

On the S. W. corner of Fifth and Pine streets.

On Fifth street, south of Crawford Park.

On the S. E. Corner of Hastings and St. Lawrence streets.

On the N. E. corner of Clifford and Montcalm streets.

On the S. E. corner of Fort and Lafontaine streets.

On the West side of Trumbull Avenue, between Lafayette and Howard streets.

On the N. E. corner of Fort and St. Antoine streets.

On the S. E. corner of Fort and St. Aubin streets.

On the S. W. corner of Clinton and St. Aubin streets.

The whole number supplied with water from the works, is 111.

Since the introduction of Steam Fire Engines into the city, complaints have been made of the insufficiency of the supply of water in the street reservoirs in some localities; this may be remedied by introducing an additional stream into them.

STOP-COCKS.

During the past season, 17 stop cocks have been put in, as follows :

LOCALITY.	No.	No.
TWENTY-FOUR INCH.		
At New Reservoir,.....	1	3
At New Engine House,.....	2	
TWELVE INCH.		
At New Engine House,.....	1	1
EIGHT INCH.		
At corner of St. Antoine and Watson streets,.....	1	2
In St. Antoine St., between Bronson and Marion streets,.....	1	
FOUR INCH.		
At New Reservoir,.....	1	11
At corner of Fort and Lafferty streets,.....	1	
At corner of Jefferson avenue and Elmwood avenue,.....	1	
In Elmwood Cemetery,.....	1	
At corner of Marion and St. Antoine streets,.....	1	
At corner of Wilkins and St. Antoine streets,.....	1	
At corner of Whitney and St. Antoine streets,.....	1	
At corner of Orleans and Jay streets,.....	1	
At corner of Russell and Watson streets,.....	1	
At corner of Brewster and St. Antoine streets,.....	1	
At corner of West Grand Circus Park,.....	1	
Total,		17

There are, in all, 278 stop cocks, as follows :

30 inch,	-	-	-	-	-	-	-	-	2
24 "	-	-	-	-	-	-	-	-	20
20 "	-	-	-	-	-	-	-	-	3
18 "	-	-	-	-	-	-	-	-	3
12 "	-	-	-	-	-	-	-	-	5
10 "	-	-	-	-	-	-	-	-	12
8 "	-	-	-	-	-	-	-	-	19
6 "	-	-	-	-	-	-	-	-	29
4 "	-	-	-	-	-	-	-	-	182
3 "	-	-	-	-	-	-	-	-	3
									<hr/>
Total No. of stop cocks,	.	-	-	-	-	-	-	-	278
Three-inch reservoir valves,	-	-	-	-	-	-	-	-	111
									<hr/>
Whole number of stop cocks and valves,	-	-	-	-	-	-	-	-	389

LOG BORING SHOP.

During the year the engine has run 133 hours—and there has been bored, sawed, and reamed, for the works, 13,024 feet of wooden logs.

NEW RESERVOIR.

The stone and brick lining in the east basin was completed and the water was again let in, on the 1st of June last.

A fence has been erected around the top of the reservoir on the water side of the walk, and a hedge of white cedar has been set around the outer line. A brick sewer has been constructed from the waste-weir of the reservoir to the Russell street sewer. This branch of the works is now regarded as fully completed.

NEW ENGINE.

The New Engine is not yet offered for acceptance by the contractors, who have been engaged during the past fifteen months setting it up. The boilers have been set, and the steam connections have been made with the engine.

NEW ENGINE HOUSE.

The floors in the New Engine House have been completed, and iron stairs and ladders, for convenience in getting around the engine, are being erected.

RAIN FALL, AND HEIGHT OF WATER.

The depth of rain which fell at the city of Detroit, during each month of the year 1860, (snow reduced to water,) observations made by Mr. J. Berry, and the surface of the Detroit River below the water table of the Engine House, are as follows :

RAIN FALL.			Surface of River below water table.	
MONTHS.	Inches.	Tenths.	Highest.	Lowest.
			Feet.	Feet.
JANUARY,.....	2	5	3. 5	6.
FEBRUARY	4	2	5. 7	6. 9
MARCH,.....	1	5	4. 5	5. 8
APRIL,.....	3	7	4. 3	4. 9
MAY,.....	2	3	4. 1	4. 3
JUNE,.....	2	5	3. 5	4. 6
JULY,.....	5	7	3. 3	4. 1
AUGUST,.....	1	5	3. 5	4. 1
SEPTEMBER,.....	2	-----	3. 7	4. 7
OCTOBER,.....	2	3	4. 2	4. 7
NOVEMBER,.....	2	1	4. 3	6. 5
DECEMBER,.....	5	2	4. 2	5. 3
Total,	35	5		

In 1854 the highest water was July 15th, 4.1; the lowest March 3d, 7.0. In 1855 the highest water was Dec. 31st, 2.7; the lowest March 20th, 6.3. In 1856 the highest water was Jan'y 2d, 2.7; the lowest Dec. 18th, 6.0. In 1857 the highest water was Feb. 25th, 3.0; the lowest Jan'y 15th, 5.5. In 1858 the highest water was June 16th, 2.4; the lowest March 15th, 4.9. In 1859 the highest water was Dec. 30th, 3.0; the lowest Nov. 13th, 5.7. In 1860 the highest water was July 6th, 3.3; the lowest Nov. 24th, 6.5.

The quantity of water which has fallen at the city of Detroit in each year, from 1840 to 1860 inclusive, is as follows :

YEAR.	FEET.	IN.	DEC.	YEAR.	FEET.	IN.	DEC.
1840.....	3	3	256	1851.....	4	4	201
1841.....	2	9	925	1852.....	3	11	720
1842.....	3	7	989	1853.....	3	3	872
1843.....	3	2	414	1854.....	4	0	679
1844.....	3	11	324	1855.....	5	11	889
1845.....	2	9	439	1856.....	3	8	750
1846.....	4	4	171	1857.....	4	0	183
1847.....	3	6	881	1858.....	3	4	400
1848.....	4	11	594	1859.....	2	9	650
1849.....	3	5	507	1860.....	2	11	500
1850.....	3	4	731	Total.....	76	0	084

The average annual rain fall for the twenty-one years past, was 3 feet 7.43 inches.

The greatest quantity which fell in any one month during the twenty-one years, was a fraction more than one foot and three inches, in July, 1855, and the least quantity in any month was a fraction more than the sixth of an inch, in February, 1841.

From the year 1840 to 1857, inclusive, the observations were made by the Rev. Geo. Duffield, and since 1857 by Mr. J. Berry.

FINANCE.

The whole amount received during the past year is as follows :

The amount received from ordinary resources, is - \$54,931 17

The amounts received by loan on bonds, is - 50,000 00

Total, - - \$104,931 17

The whole amount received from water rates during the past year is \$49,434.90, being \$655.86 more than the amount received the previous year.

The whole amount of expenditures of the Board during the past year was \$78,971.37, of which \$18,957.61 was for reconstructing, enlarging and extending the works; \$14,543.01 was for pumping water,

repairs and management of the works; and \$45,470.75 was for miscellaneous expenditures, of which \$43,836.71 was for interest on the loans. The available balance on hand is \$59,141.80.

The entire expenditures of the Board for reconstrue-	
ting and extending the works, including \$24,500	
advances on new engine, and deducting \$13,180.80	
credits, is - - - - -	\$595,783 45
Balance on hand, - - - - -	61,692 56

Expenditures and balance on hand, - -	\$657,476 01
The total liabilities incurred by the Board are -	650,000 00

Excess of expenditures for construction and balance	
on hand, over liabilities incurred, - -	\$7,476 01

The whole amount paid during the year past for in-	
terest on loans, and current expenses over and	
above credits to same, is - - - -	\$54,997 84
The whole amount received for water rates is -	49,434 90

Showing a deficit of - - - - -	\$5,562 94
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in the receipts to meet the annual current expenses and interest. Extraordinary and unexpected expenditures were required to be made at the engine house the past season, and further extraordinary expenditures will be required to be incurred there the coming season, for new boiler and repairs on both engines, to render them effective and sure to rely upon to keep up the supply of water. The entire receipts from ordinary resources, since the works have been under your management, have exceeded your expenditures for the current expenses, and interest, \$7,476. It should be borne in mind that the present works are constructed on a much larger scale than is required to supply the present population of the city, and adequate for at least three times the present population, and that a large sum of the amount received by loan, was expended to provide means of protection against fires, which, so far, is properly chargeable to that branch of the municipal expenses, and not to the water fund, for the reason that this protection is afforded to a large amount of property which does not in any manner whatever contribute to the water fund. I would respectfully refer you to what I said on this subject in my annual assessment report in July last.

The rates at present charged for water are as low, or lower, than that charged by other works of similar character, and sufficient to meet all expenses properly chargeable to the works. It is undoubtedly wise policy to continue to furnish the inhabitants with water at the lowest possible rate; but as the receipts from rates constitute the only resource to meet the expenses and continue the supply of water, they should at no time be less than sufficient for that purpose, and if such portions of the expenditures as are now paid by the works, which are properly chargeable to other funds, were paid by the city at large, no change in the present established rates would be required.

The works being constructed on a scale to provide for the wants of the next generation, it is but just to the present, to keep the rates as low as possible and meet the present requirements, and rely upon an increase in the uses of water from the works, to increase the annual receipts, which, it is confidently expected, should the works be relieved from the payment of the interest properly chargeable to other branches of the city government, will be sufficient, before the amount of excess of the receipts over the current expenses since the works have been managed by the Board is absorbed, to pay the current expenses and interest, and leave a surplus annually to go into a sinking fund.

The sum of \$150,000 has been obtained by you under the act of the Legislature of February 10th, 1857, and you have authority under said act to loan the further sum of \$100,000.

The whole amount of interest received by you for the money obtained by loans during the period of its disbursement in the construction of the works, is \$55,112.69, being seven per cent., the rate paid on the loans.

The whole cost of the main and distributing pipes laid by the Board is \$377,222.11, and of the other branches of construction, reservoirs, engine house, engine, fire hydrants, &c., \$231,242.14; total, \$608,964.25; less \$13,130.80 credited to the above, leaving the net amount expended for construction, \$595,783.45. And the amount expended by the Common Council, before the works were placed under your management, was \$181,015.93, making the total amount expended for construction of the works, \$776,799.38.

The whole amount expended by the Commissioners

for construction since March 1st, 1852, is, - \$595,783 45

The value of such parts of the old works now in use, being engines, engine house, tower, distribution pipes, wharf lot, and reservoir lot on Prospect street, is - - - - - - - \$94,000 00

Present valuation of works - - - \$689,733 45

To which add balance on hand - - - 61,692 56

Valuation of the works, and cash on hand - \$751,476 01

The total liabilities of the works are - - 650,000 00

Value of the works over liabilities - - \$101,476 01

During the year permits were issued to one hundred and seventy-nine families to procure water free of charge, on the certificate of the Director of the Poor that they were unable to pay therefor.

There were five hundred and twenty-five water-takers returned by the collectors during the year to be shut off for non-payment of water rates, a large number of whom promptly paid the amount due, when informed that they were returned; of those shut off, one hundred and twenty-two have paid the amount due, and had the water again let on.

The following is a full and detailed Statement of the Receipts and Expenditures of the Board for the past year :

RECEIPTS

From December 31st, 1859, to December 31st, 1860.

For Water Rates.

Of 1856-57	\$48 67	
" 1857-58	273 55	
" 1858-59	1,230 45	
" 1859-60	30,551 00	
" 1860-61	17,331 23	
		<hr/> \$49,434 9

For Service-Cocks,

And drilling iron pipes	328 00	
	<hr/>	328 00

For Per Centage.

This amount added to delinquent water rates, paid in the office,	887 73	
	<hr/>	887 73

For Shutting off Water,

For non-payment of rates,.....	\$60 75	\$60 75
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For Interest.

On unexpended balance of loans,.....	2,818 20	
Accrued on bonds sold,.....	351 38	
From J. C. Goodrich & Co.,.....	17 50	
		3,187 08

For Iron Pipe.

Sept. 13.	From Henry Miller, for pipe,.....	58 00	58 00
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For Engine House.

Jan. 9.	From N. Tomlinson, for ashes,.....	28 18	28 18
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For New Engine House.

Aug. 20.	From R. Bulmer, for crane,.....	120 00	120 00
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For New Reservoir.

April 9.	From Geo. Pearson, check not called for,.	3 75	
"	" H. Langly for old barrels,.....	9 00	
			12 75

For Wood Distribution Pipe.

Jan. 17.	From I. J. Merritt, for use of boring machine,	33 00	
Feb. 9.	" " " " "	95	
March 5.	" " " " "	70	
April 13.	" " " " "	4 00	
June 13.	" J. F. Munro, for logs laid,.....	35 61	
July 6.	" I. J. Merritt, for use of boring machine,	2 92	
" 13.	" F. Munro, for logs laid,.....	11 00	
Aug. 4.	" I. J. Merritt, for use of boring machine,	1 03	
Sept. 28.	" J. Hendrickson, for logs laid,.....	21 60	
" 14.	" Trustees of Elmwood Cemetery for logs laid,.....	414 78	
Oct. 6.	" Skating Park association, for logs laid	44 32	
			569 91

For Stop-Cocks.

Oct. 6.	From Trustees Elmwood Cemetery, stop-cocks,	50 00	50 00
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For Repairing Leaks.

Aug. 17.	From Novelty works, error in voucher....	25	
Nov. 10.	" Pay roll, error refunded,.....	26 62	
			26 87

Sept. 27.	From E. W. Wright, for horse,.....	\$50 00	
		<u> </u>	50 00

Jan. 13.	From R. D. Wood & Co., for labor,.....	15 00	
		<u>15 00</u>	\$15 00

90 00
90 00

12 00

12 00

From Weston, Dortic & Co., for bonds sold	54,931 17
	<hr/> 50,000 00
Balance on hand Jan. 1st, 1860,.....	104,931 17
	<hr/> 35,732 76
Total,.....	<hr/> \$140,663 93

CONSTRUCTION.

Feb. 1.	Paid C. Kellogg & Co., for castings,.....	\$167 49
"	G. B. Russell " ".....	138 39
"	R. D. Wood & Co., for interest,.....	6 07
"	J. Houghton, for exchange,.....	7 84
May 11.	R. D. Wood & Co., for pipe,.....	566 64
June 9.	Rackson & Wiley, for pipe,.....	40 44
July 10.	W. Barclay & Son, for castings,.....	24 43
"	Charles Kellogg & Co., for castings,.....	16 10
"	R. D. Wood & Co., for pipe in 1859,...	1039 89
		<hr/> \$2007 19

Feb. 1.	Paid John Hanford, for damages,.....	150 00
	“ G. B. Russell, for receipt given,.....	5 57
	“ Samuel Hurst, for drain,.....	6 00
	“ Micheal Butler, for cartage,.....	13 20
	“ Barnes, French & Way, for printing,.....	1 00
	“ B. B. Moore, for services,.....	45 00
	“ Joseph Hantz, for wood,.....	2 50
	“ F. Neijman, “ “	2 50
	“ G. W. Knowles, for boxes,.....	20 50
	“ Buhl & Ducharme, for iron,.....	18 39
	“ J. Cunningham and others, for labor,....	185 53
April 10.	“ P. Maddigan and others, for labor,.....	23 50
	“ H. Smith, for paving,.....	11 31
May 10.	“ B. B. Moore and others, for labor,.....	71 92
	“ Peter Paton, for repairing tools,.....	1 14
	“ H. W. Chandler, for rep. cross walks,...	13 86

May 10.	Paid	M. Butler, for cartage,.....	\$ 3 20
June 9.	"	B. B. Moore and men, for labor,.....	274 11
	"	Adam Plantz, for repairing tools,.....	10 22
	"	M. Butler, for cartage,.....	2 00
July 10.	"	B. B. Moore and others, for labor,.....	637 24
	"	M. Butler, for cartage,.....	17 00
	"	W. Barclay & Son, for chisels,.....	75
	"	Joseph Conrad, for cartage,.....	1 50
Aug. 13.	"	Peter Paton, repairing tools,.....	1 95
	"	C. Hurlbut, for packing,.....	22 80
	"	Dennis Driskil, for labor,.....	3 00
	"	M. Henderson, for cartage,.....	11 81
	"	Marvin & Stevens, for nails,.....	3 25
	"	J. Flowers & Bro., for tools,.....	1 35
	"	M. Butler, for cartage,.....	7 80
	"	W. J. Brown, for cartage,.....	1 00
			<hr/> \$1,570 90
Less this amount charged sundry accounts,			181 00
			<hr/> \$1,389 90

For Stop-Cocks.

Feb. 1.	Paid	G. B. Russell, for stop-cock,.....	250 00
	"	" for cast boxes,.....	62 85
March 10.	"	W. Barclay for stop-cock,.....	250 00
	"	G. B. Russell & Co., for stop-cock,.....	250 00
April 10.	"	John Cook, for wrench,.....	2 60
	"	G. W. Railway, for freight,.....	3 25
May 10.	"	W. Barclay, for casting and altering pat- terns,.....	150 00
June 9.	"	G. B. Russell & Co., for castings,.....	518 15
	"	Jackson & Wiley, for ".....	8 63
	"	Geo. White, for lead,.....	99
	"	Edward Granger, for boxes,.....	6 40
July 10.	"	W. Barclay & Son, for stop-cock,.....	319 70
	"	M. Henderson, for cartage,.....	10 00
	"	T. J. Noyes, for sheet lead,.....	54
Aug. 13.	"	G. B. Russell, for castings,.....	56 88
	"	C. P. Woodruff, for packing,.....	3 38
Oct. 10.	"	W. Barclay & Son, for stop-cocks,.....	234 00
	"	G. W. Knowles, for boxes,.....	23 50
Dec. 8.	"	G. W. Knowles, for boxes,.....	6 00
			<hr/> \$2,156 87

For New Reservoir.

Feb. 1.	Paid	Daily Advertiser, for printing,.....	3 75
	"	J. S. Cuthbert, for cask,.....	2 00
	"	Barnes, French & Way, for printing,.....	9 50
	"	M. Vogle, for labor,.....	2 63
April 10.	"	H. Langley and others,.....	532 18
	"	Patrick Hincer and others,.....	45 09
	"	T. Lambert and others,.....	271 64
	"	H. Oxenfield, for timber,.....	50
	"	Edward O'Brien, for labor,.....	4 00
	"	Wm. Snow, for brass wire,.....	9 88
	"	J. C. Goodrich & Co., for stone,.....	1,083 03
May 8.	"	H. Langley and others, for labor,.....	893 92
	"	John Grasser and others, for labor,.....	375 10
	"	Jacob Muth and others, for labor,.....	92 24
	"	Jacob Muth, for team,.....	4 91
	"	Carl Nohe, for labor,.....	2 81
	"	J. Colby, for labor,.....	2 63

June 9.	Paid H. Langley and others, for labor,	\$501 60
	" H. Deverie and others, for labor,	315 60
	" Mathew Gainey for labor,	5 50
	" D. Gladwich, for trees,	23 10
	" J. L. Muth, for labor,	24 41
	" B. G. Stimson, for water lime,	5 72
July 10.	" H. Langley and others, for labor,	189 20
	" J. Brunner and others, for labor,	66 71
	" Andrew Peterson and others, for labor, ...	34 32
	" Mathew Gainey, for labor,	16 50
	" J. L. Muth, for labor,	101 88
	" T. J. Noyes, for nails,	90
	" H. Langley & Son, for sodding banks,	103 17
	" Adams & Eddy, for wire cloth and screen, ..	4 00
	" Andrew Harvie, for hydrants,	9 75
	" Monroe Shier, for fence,	675 44
	" Robert Fox, for repairing tools,	15 50
	" Office, for nails,	32
Aug. 13.	" John Hess and others, for labor,	5 88
	" J. Flowers & Bro., for repairing pump,	2 10
	" J. L. Muth, for labor and team,	35 13
	" M. McNamanar for labor,	11 81
	" C. Hurlbert, for twine,	1 00
	" Marvin & Stephens, for nails,	1 50
	" John Hutchins, for cedar plants,	40 00
Sept. 10.	" Jacob Muth for labor,	4 88
Sept. 12.	" Arthur O'Conner, for drain,	170 00
Nov. 10.	" T. J. Noyes, for locks,	3 00
Dec. 31.	" J. M. Davis, for drain,	300 90
	" Wm. Adair, for trees,	15 00
	" Free Press, for printing,	5 00
	" J. C. Goodrich & Co., for per cent. 1859, ..	364 16
		<hr/> \$6,389 79

For Engineering.

Feb. 1.	Paid Henry Duncan, for repairing harness, &c.,	15 39
	" Monroe Shier, for lumber and labor,	3 34
	" Office, for horse feed and hire,	4 00
	" W. E. Hill, for drafting,	20 25
	" S. Moore, for repairing buggy,	9 75
	" W. P. Loomis, care of horse,	2 00
	" Elijah Davis, for oats,	6 94
March 10.	" J. Hanford, for hay,	12 51
	" E. Lheiler, for drafting,	17 00
	" J. Schamadon, for horse shoeing,	1 93
	" Office, for horse feed,	2 00
April 10.	" J. F. Munro, for surveying,	37 00
	" W. McCarthy, for horse shoeing,	1 50
	" Office for horse feed,	1 00
	" W. Warner & Co., for lumber,	72 00
	" E. Lheiler, for drafting,	30 00
May 8.	" A. Maranhatt, for horse shoeing,	2 63
	" Richmonds & Backus, drawing paper,	13 00
	" Office, for horse feed, &c.,	2 37
	" Warren E. Hill, for drafting,	10 50
June 9.	" W. P. Loomis, for care of horse,	5 00
	" Office, for horse feed,	1 00
	" J. F. Munro, for surveying,	104 00
	" J. Schamaden, for horse shoeing,	2 00
July 10.	" J. F. Munro, for surveying,	48 00
	" Edwin Jackson, for oats,	3 03
	" Office, for horse feed,	1 25

Aug. 13.	Paid B. B. Moore, for use of horse,.....	\$10 00
	" Farrand & Sheley, for chamois skiu, &c.,..	1 01
	" Office, for horse hire,.....	2 00
Oct. 10.	" A. Wight, for horse hire,.....	7 50
	" E. Bigelow, for horse keeping,.....	3 00
	" J. L. Muth, for horse keeping,.....	3 50
Dec. 10.	" A. Paldi, for drafting,.....	12 00
	" G. W. Howe, for horse hire,.....	11 00
	" H. Duncan, for repairing harness,.....	2 73
Dec. 31.	" A. Paldi, for drafting,.....	51 00
		<hr/> \$461 85

For New Engine.

Feb. 1.	Paid N. P. Jacobs, for paint,.....	8 94
May 11.	" Am. Express Co. for freight,.....	18 00
Aug. 13.	" Clark's Fire Reg. Co., regulator,.....	156 16
Dec. 31.	" J. Flower & Bro., for drip pipes,.....	47 18
		<hr/> \$230 88

For New Engine House.

Feb. 1.	Paid E. Granger and others, for labor,.....	92 91
	" M. Quinn, for cutting pipe,.....	12 00
	" M. Butler, for cartage,.....	1 60
	" McDuff & Mitchell, for hand rail, &c., to stairs,	150 55
	" Louis Conrad, for cutting stone,.....	18 75
March 10.	" E. Granger and others, for labor,.....	161 13
	" J. Benebeck, for labor,.....	20 00
	" Phoenix Iron Co., for purlins,.....	41 71
	" F. L'Esperance, for lime and sand,.....	6 90
	" H. Setterlet, for coal,.....	5 75
	" H. Moester, for labor,.....	10 50
	" J. Mellrass, for use of screws,.....	16 00
	" Mich. Southern R. R Co., for freight,.....	3 72
	" C. Kellogg & Co., for screws, bolts, &c.,...	11 35
	" G. B. Russell & Co., for castings,.....	157 01
	" M. Butler, for cartage,.....	2 40
April 10.	" E. Granger and others, for labor,.....	108 18
	" John Cook, for smith work,.....	34 25
	" M. Butler, for cartage,.....	1 60
	" T. J. Noyes, for iron,.....	33 38
	" Joseph Hantz, for coal,.....	5 25
	" W. F. Chittenden, for boiler plugs,.....	2 00
	" Peter Paton, for smithwork,.....	8 00
May 11.	" James Robinson and others, for labor,....	9 75
	" Wm. Dooley and others, for labor,.....	26 69
	" P. E. Demill, for bridge walls of boilers,..	265 00
	" P. E. Demill, for fire clay and sand,.....	3 00
	" F. C. Van Antwerp, for repairing tools,...	2 19
	" Robert Common, for labor and materials,	20 00
	" Peter Paton, for iron stoppers,.....	13 40
	" Locomotive works, for iron work,.....	150 00
	" Buhl & Ducharme, for iron,.....	6 94
June 9.	" Edward Granger and others, for labor,....	66 42
	" B. G. Stimson, for water lime,.....	1 25
	" A. Frumveller, for stoppers, rivets, &c.,...	22 90
	" M. Butler, for cartage,.....	2 20
	" Robt. Common, for mason work setting boilers,.....	812 00
	" Robt. Common, for extra work on boiler,	70 00

June 9.	Paid Isaac Irwin, for flagging stone,.....	\$25 84	
	“ Jackson & Wiley, for bolts, thimbles, &c.,.....	19 90	
	“ Geo. White, for tapping boilers,.....	1 75	
	“ C. Kellogg & Co., for castings,.....	53 15	
	“ Geo. B. Russell, for castings,.....	103 11	
July 10.	“ James Young and others, for labor,.....	9 00	
	“ John Dunham, for work on boiler,.....	11 49	
	“ A. Frumveller, for work on boiler,.....	53 60	
	“ W. Barclay & Son, for iron work,.....	117 63	
	“ Louis Conrad, for stone cutting,.....	29 75	
	“ Charles Kellogg & Co., for iron work,....	5 70	
	“ Daily Advertiser, for printing,.....	2 00	
Aug. 13.	“ W. H. Tefft, for steam guage,.....	45 00	
	“ Peter Paton, for smith work,....	16 63	
	“ A. C. Porter, for rivets,.....	1 10	
	“ J. Flowers & Bro., for iron work,.....	56 78	
	“ A. Frumveller, for work on boilers,.....	53 26	
	“ Joseph Mailleck, for hauling,.....	7 50	
Sept. 10.	“ H. K. Messenger & Son, for asphaltum,...	25 00	
	“ C. P. Woodruff, for felt,.....	30 24	
	“ L. Grisinger, for mason work,.....	22 00	
	“ A. Smith, for labor,.....	5 50	
	“ L. Coteau, for labor,.....	3 50	
	“ M. Butler, for cartage,.....	1 20	
Oct. 10.	“ W. Dooley and others, for labor,.....	35 51	
	“ F. L'Esperance, for sand, &c.,.....	4 61	
	“ A. Frumveller, for work on boilers,.....	18 06	
	“ W. Barclay & Son, for planing damper,...	10 00	
	“ C. Kellogg, for bolts, &c.,.....	5 58	
	“ H. Volk, for labor,.....	50	
	“ J. B. Hinchman, for cement,.....	6 75	
	“ J. Flowers & Bro., for water guages,.....	25 55	
	“ Peter Rottle, for labor,.....	3 44	
	“ W. Dillas, for labor,.....	2 25	
Nov. 10.	“ W. Dooley, for labor,.....	7 00	
Dec. 10.	“ Peter Paton, for scrapers,.....	4 45	
	“ Peter Fortou, for labor,.....	5 63	
Dec. 31.	“ G. B. Russell, for castings,.....	89 95	
	“ John Cunningham and others, for labor,...	12 00	
	“ Dennis Sweeney, for labor,.....	3 00	
	“ A. Frumveller, for drip pans, &c.,.....	34 75	
	“ Peter Fortou, for axe,.....	1 50	
	“ B. G. Stimson, for water lime,.....	2 30	
		<hr/>	\$3,350 14

For Lead.

Aug. 13.	Paid T. J. Noyes, for lead,.....	133 34	
		<hr/>	133 34

For Inlet Pipe.

Oct. 10.	Paid C. Kellogg & Co., for fitting,.....	4 35	
		<hr/>	4 35

For Water Meters.

April 10.	Paid Office, for cartage,.....	60	
Dec. 31.	“ Office, for straw,.....	1 00	
		<hr/>	1 60

For Wood Distribution Pipe.

Jan. 3.	Paid Wood, account for wood,.....	80 88	
Feb. 1.	“ G. B. Russell, for thimbles,.....	44 73	

March 10.	Paid M. Butler, for cartage,.....	\$ 40	
April 10.	" J. O'Brien and others, for labor,.....	21 53	
	" M. Butler, for cartage,.....	60	
	" J. Flowers & Bro., for repairs engine.....	22 69	
May 11.	" James Ross & Co., for lead pipe,.....	3 77	
June 9.	" M. Butler, for cartage,.....	3 03	
	" W. J. Brown, for logs,.....	56 60	
	" Laying pipe account, for labor,.....	90 00	
July 10.	" I. J. Merritt, for labor,.....	21 85	
	" M. Butler, for cartage,.....	5 20	
	" E. Devery, for cutting files,.....	4 93	
Aug. 13.	" B. B. Moore and others, for labor,.....	338 65	
	" I. J. Merritt and others, for labor,.....	40 57	
	" W. J. Brown, for logs,.....	6 20	
	" W. J. Brown, for logs,.....	50 00	
	" J. Flowers & Bro., for repairing tools,....	2 03	
	" M. Butler, for cartage,.....	11 39	
Sept. 1.	" A. C. Green, for logs,.....	56 10	
Sept. 10.	" B. B. Moore and others, for labor,.....	319 66	
	" Peter Poberts and others, for labor,.....	14 75	
	" W. J. Brown, for logs,.....	35 80	
	" B. B. Moore, for expenses to St. Clair,....	6 07	
	" M. Butler, for cartage,.....	19 70	
	" C. Kellogg, for cartage,.....	30 79	
Oct. 10.	" B. B. Moore and others, for labor,.....	247 85	
	" Peter Roberts and others, for labor,.....	16 01	
	" A. C. Green, for logs,.....	61 37	
	" J. Flowers & Bro., for bits, &c.,.....	9 00	
	" M. Butler, for cartage,.....	14 01	
Nov. 10.	" B. B. Moore and others, for labor,.....	255 50	
	" T. J. Noyes, for saw, axe and hammer,....	3 75	
	" M. Butler, for cartage,.....	10 60	
Dec. 10.	" B. B. Moore and others, for labor,.....	193 19	
	" M. Butler, for cartage,.....	5 80	
Dec. 31.	" B. B. Moore and others, for labor,.....	115 33	
	" I. J. Merritt, for grindstone, &c.,.....	10 00	
	" J. Flowers & Bro., repairing tools,.....	1 25	
		<hr/>	\$2,231 58

For Pipe Yard.

Feb. 1.	Paid G. B. Russell, for cast plates, &c.,.....	39 48	
March 10.	" Saml. Burrell and others, for labor,.....	14 88	
June 9.	" Office, for nails,.....	60	
July 10.	" Edward Granger and others, for labor....	47 75	
Aug. 10.	" Wm. Dooley and others, for labor,.....	47 67	
	" Charles Racine, for labor,.....	8 00	
Sept. 10.	" Wm. Dooley and others, for labor,.....	54 76	
		<hr/>	213 14

For Public Drinking Hydrants.

Feb. 1.	Paid Monroe Shier, for box,.....	2 25	
		<hr/>	2 25

For Fire Hydrants.

Feb. 1.	Paid G. B. Russell, for hydrants,.....	189 00	
March 10.	" G. B. Russell, for hydrants,.....	189 22	
May 10.	" Daniel Knapp, for labor,.....	4 13	
July 10.	" W. Barclay & Son, for bolts, &c.,.....	1 38	
Aug. 13.	" Farrand & Sheley, for red lead,.....	1 00	
		<hr/>	384 73

Total for construction.....\$18,957 61

EXPENSE AND REPAIRS.

For Engine House.

Feb. 1.	Paid F. M. Wing, engineer, and others, for services.....	\$144 17
	“ A. Frumveller, for lead pipe.....	1 20
	“ T. J. Noyes, for tin and labor.....	36 06
	“ J. Bellows, for packing.....	6 75
	“ M. Butler, cartage.....	23 99
March 10.	“ F. M. Wing, engineer, and others, for services.....	144 17
	“ M. Butler, for cartage.....	16 72
	“ J. Galleineau, for rags.....	66
	“ Mich. Oil Co., for oil.....	57 95
	“ C. Kellogg & Co., for rod and bolts.....	1 60
April 10.	“ F. M. Wing, engineer, and others, for services.....	144 17
	“ Mich. Oil Co., for oil.....	79 33
	“ Jas. Gibbins, for labor.....	13 00
	“ J. B. Julerett, for rags.....	1 89
	“ M. Butler, for cartage.....	32 00
May 10.	Paid F. M. Wing, engineer, and others, for services.....	154 17
	“ Mich. Oil Co., for oil.....	41 80
	“ M. Butler, for cartage.....	29 32
	“ J. B. Julerett, for rags.....	1 95
	“ J. B. Julerett, for rags.....	4 25
	“ Jacob Muth, repairing clock.....	1 50
June 9.	“ F. M. Wing, engineer, and others, for services.....	154 17
	“ Jackson & Wiley, for repairing engine.....	2 25
	“ Geo. White, for plumbing.....	12 86
	“ C. Kellogg & Co., for repairs.....	3 73
	“ A. Frumveller, repairing pipe.....	25
	“ M. Butler, for cartage.....	44 84
	“ Levi House, for painting.....	2 12
	“ Mich. Oil Co., for oil.....	41 80
	“ J. B. Julerett, for rags.....	2 55
July 10.	“ F. M. Wing, engineer, and others, for services.....	181 76
	“ W. Barclay & Son, for wrench, bolts, &c....	4 10
	“ M. Butler, for cartage.....	28 40
Aug. 13.	“ A. E. Baker, engineer, and others, for services.....	200 17
	“ M. Butler, for cartage.....	46 64
	“ Novelty Iron Works, repairing indicator.....	25 44
	“ C. P. Woodruff, for packing.....	8 50
	“ Peter Paton, for repairs.....	2 56
	“ C. Hurlbut, for brooms.....	5 62
	“ Thomas McCarthy, for labor.....	2 41
	“ O. Bellows, for packing.....	9 04
	“ Mich. Oil Co., for oil.....	82 18
	“ Fred Riter, for labor.....	19 00
	“ Joseph Gagnier, for sand.....	12 98
	“ Farrand & Sheley, for turpentine.....	1 25
	“ P. Cunningham, for labor.....	5 41
	“ J. B. Julerett, for rags.....	1 44
	“ Geo. Hager, for repairing pump.....	75
	“ J. Flowers & Bro., repairing engine.....	48 44
	“ Jas. Young, for labor.....	1 50

Sept 10.	Paid A. E. Baker, engineer, and others, for labor	\$156 17
	" C. Kellogg & Co., for repairs.....	60 51
	" Am. Express Co., for freight.....	3 00
	" Shulte & Bro., for tallow.....	26 80
	" Thos. Little, for rags.....	1 00
	" A. Laitner, for brushes.....	4 00
	" Office, for pails.....	60
	" M. Butler, for cartage.....	22 68
Oct. 10.	" A. E. Baker, engineer, and others, for services.....	158 17
	" A. Frumveller, for oil dripper.....	90
	" Brand Bros., for liquid.....	20 00
	" W. Barclay & Son, for plugs, &c.....	12 50
	" C. P. Woodruff, for packing.....	7 50
	" C. Kellogg & Co., for babbit metal.....	12 55
	" J. Flowers & Bro., for repairing engine.....	24 48
	" F. Wetmore, for lamps.....	2 50
	" Cornwell, Barns & Co., for rags.....	5 25
	" M. Butler, for cartage.....	23 60
	" Mich. Oil Co., for oil.....	44 00
Nov. 10.	" A. E. Baker, engineer, and others, for services.....	177 17
	" H. Turner, for water barrel.....	1 00
May 10.	" S. Davis, for key.....	60
	" R. Common, for brick.....	4 40
	" Mich. Oil Co., for oil.....	42 00
	" John Dunham, for repairing heater.....	5 30
	" M. Butler, for cartage.....	12 12
	" J. Flowers & Bro., for steam connection..	502 13
	" T. Little, for rags.....	1 00
Dec. 10.	" A. E. Baker, engineer, and others, for services.....	207 61
	" T. J. Noyes, for felting.....	31 15
	" O. Bellows, for packing.....	7 88
	" M. Foulon, for rags.....	96
	" A. Gronan, for carriage.....	2 50
	" T. J. Hurlbut, for ice.....	8 72
	" M. Vogle, for rags.....	64
	" J. Dunham, for heater.....	155 00
	" M. Vogle, for rags.....	1 98
	" Office, for telegraph.....	3 05
Dec. 31.	" A. E. Baker, engineer, and others, for services.....	187 17
	" Mathew Gainey and others, for labor.....	12 00
	" John Cook, for smith work.....	3 63
	" M. Vogle, for rags.....	70
	" P. Burns, for carriage.....	75
	" J. Julcret, for brushes.....	1 95
	" Mich. Oil Co., for oil.....	43 50
	" T. J. Noyes, for repairing engine.....	25 30
	" A. Frumveller, for copper pipe, &c.....	5 83
	" John Bloom, for covering pipes.....	40 39
	" J. Flowers & Bro., for steam stops.....	7 58
		<hr/> \$3,969 00

For Wood and Coal.

For 56 $\frac{1}{2}$	cords wood at 10s.....	\$70 63
" 81 $\frac{1}{2}$	" " at 10s. 6d.....	106 50
" 11 $\frac{3}{4}$	" " at 11s.....	16 18
" 23	" " at 12s.....	34 50
" 31 $\frac{1}{2}$	" " at 13s.....	51 19
" 45 $\frac{20}{128}$	" " at 14s.....	796 50

For 460- $\frac{10}{8}$ cords wood at 15s.....	\$862 66
“ 102 $\frac{1}{4}$ “ “ at 16s.....	204 50
“ 58 $\frac{1}{2}$ “ “ at 18s.....	131 63
“ 63 “ “ at 19s.....	149 63
“ 31 $\frac{1}{8}$ “ “ at 20s.....	7 77
“ 96 $\frac{3}{4}$ “ “ at 20s. 6d.....	246 96

1,442 $\frac{3}{4}$ cords—average cost per cord, \$1.85- $\frac{1}{10}$..\$2,678 65

Paid A. J. Fraser for 201 tons 1,055 lbs. coal, at
\$3..... 604 58

“ J. E. Pittman for 247 tons 1,190 lbs. coal, at
\$4..... 990 38

\$4,273 61

Less this amount charged wood dis. pipe ac't... 80 88

\$4,192 73

For Office.

Feb. 1.	Paid Michigan Journal, for advertising.....	2 50
	“ Daily Advertiser, for advertising.....	5 50
	“ Barns, French & Way, for advertising.....	6 50
	“ Monroe Shier, for repairing door.....	75
	“ Office, for exchange, gas, &c.....	34 83
March 10.	“ Detroit Free Press, for printing report....	177 30
	“ N. Y. Tribune, for advertising.....	1 50
	“ Am. Express Co., for transportation of Bonds.....	6 25
	“ Am. Express Co., for transportation of Bonds.....	6 25
	“ J. E. Scripps, for pamphlets.....	1 00
	“ Office, for exchange, postage and gas.....	9 05
April 10.	“ Am. Express Co., for transporting bonds..	18 75
	“ Mich. Democrat, for advertising.....	1 25
	“ Office, for postage, gas, &c.....	4 15
May 10.	“ Carl Busch, for steel pens.....	1 25
	“ Office, for exchange, postage, &c.....	21 38
	“ Michigan Journal, for advertising.....	2 50
	“ Richmonds & Backus, binding reports, &c.,	39 26
	“ Am. Express Co., for transporting bonds..	1 88
	“ Patrick Connor, for sawing wood.....	3 12
	“ Nicholas Henry, for carriage.....	1 50
	“ M. Butler, for cartage.....	2 50
June 9.	“ Office, for exchange and postage.....	4 32
July 10.	“ C. B. Mosher, for assessing.....	26 00
	“ D. Kendall, for assessing.....	23 00
	“ J. Deville, for assessing.....	20 00
	“ J. Sharp, for assessing.....	17 00
	“ A. Wight, for horse hire.....	15 00
	“ Daily Advertiser, for advertising.....	8 50
	“ Office, for exchange, postage, &c.....	5 50
Aug. 10.	“ C. B. Mosher, for copying assessment rolls..	40 00
	“ C. Hurlbut, for brooms.....	75
	“ Michigan Journal, for advertising.....	2 50
	“ Friend Palmer, for binding assessment books.....	20 50
	“ Daily Advertiser, for advertising.....	7 50
	“ S. D. Elwood, for stationery.....	13 13
	“ Office, for postage.....	1 38
	“ Richmonds & Backus, for stationery.....	14 00
Sept. 10.	“ Office, for postage.....	1 40
Oct. 10.	“ Office, for postage.....	1 32

Nov. 10.	Paid Daily Advertiser, for advertising.....	\$11 00
	“ James Ellis, for cleaning and whitewashing office.....	14 00
	“ A. H. Worcester, glazing.....	3 75
	“ E. Shepard, for matting.....	40 64
	“ Office, for postage and gas.....	68
Dec. 10.	“ Myler & Roach, for repairs in office.....	67 00
	“ T. J. Noyes, stove pipe, &c.....	7 23
	“ J. T. Daglish, for painting.....	4 50
	“ M. Stevens, for rack.....	7 00
	“ Mich. Journal, for advertising.....	2 50
	“ T. J. Hurlburt, for ice.....	7 38
	“ Office, for postage.....	1 45
Dec. 31.	“ John Albricht, for sawing wood.....	2 00
	“ P. Murphy, for sawing wood.....	6 00
	“ S. D. Elwood, for stationery.....	9 89
	“ Free Press Office, for printing.....	68 00
	“ Office, for gas, &c.....	2 50
	“ T. J. Noyes, for conductor.....	1 82
	“ J. Houghton, for salary as sup't and engi- neer.....	1,333 36
	“ R. E. Roberts, for salary as secretary.....	1,500 00
	“ Edward Ecard, for salary as clerk.....	520 00
		<hr/> \$4,181 47

For Repairing Leaks.

Jan. 31.	Paid P. Madigan and others, for labor.....	\$34 00
Feb. 1.	“ B. B. Moore and others, for labor.....	132 00
	“ M. Butler, for cartage.....	80
	“ Office, for cartage.....	40
	“ P. McClough, for straw.....	7 00
	“ T. J. Noyes, for pick handles.....	1 13
	“ Atkinson & Co., for glazing.....	63
	“ T. & J. Hinchman, for oil.....	2 00
	“ G. B. Russell, for castings.....	10 18
March 10.	“ B. B. Moore and others, for labor.....	175 00
	“ H. Bryant, for wood.....	2 50
	“ B. B. Moore and others, for labor.....	170 00
April 10.	“ John Cook, for bands and bolts.....	2 01
	“ J. Bour, for earth.....	2 00
	“ J. Flowers & Bro., for repairing tools.....	7 15
	“ T. J. Noyes, for lead pipe.....	3 16
	“ H. Smith, for paving.....	14 67
	“ Office, for cartage.....	80
May 11.	“ B. B. Moore and others, for labor.....	187 04
	“ H. Smith, paving.....	5 13
	“ M. Butler, for cartage.....	80
June 9.	“ Laying Pipe account, for labor.....	91 00
	“ P. Maddigan and others, for labor.....	116 00
	“ Office, for cartage.....	98
	“ John Cook, for wrench.....	1 25
July 12.	“ M. Butler, for cartage.....	60
	“ Dennis Kilcy and others, for labor.....	121 00
	“ T. J. Noyes, for shovels.....	6 64
	“ Office, for cartage.....	1 65
Aug. 13.	“ D. Guiney and others, for labor.....	181 10
	“ H. Smith, for paving.....	55 55
	“ T. J. Noyes, for pick handles.....	1 13
	“ W. Knowles, for cartage.....	1 00
	“ T. & J. Hinchman, for oil.....	1 00
	“ Farrand & Sheley, for oil.....	1 25
	“ J. Flowers & Bro., for repairing tools.....	40

Aug. 13.	Paid Office, for cartage.....	\$ 60
Sept. 10.	“ Dennis Kilcy and others, for labor.....	265 63
	“ Richard Lease, repairing handles.....	88
Oct. 10.	“ M. Barns and others, for labor.....	128 41
	“ M. Shier, for staples, &c.....	1 72
	“ Office, for cartage.....	40
Nov. 10.	“ D. Guiney and others, for labor.....	128 00
	“ M. Butler, for cartage.....	2 00
	“ J. J. Rhodes, for wheelbarrow.....	3 25
	“ T. J. Noyes, for shovel.....	1 00
	“ Office, for cartage.....	90
	“ H. Smith, for paving.....	8 38
Dec. 10.	“ John Dwire and others, for labor.....	48 75
	“ Peter Paton, smith work.....	2 76
	“ Samuel Clement, for plugs.....	3 25
	“ G. W. Knowles, boxes.....	5 50
	“ H. Hubbard, paving.....	2 60
	“ T. J. Noyes, for shovels.....	4 00
	“ Office, for cartage.....	40
Dec. 31.	“ D. Guiney and others, for labor.....	104 50
	“ W. Wingert, repairing hydrant.....	1 00
	“ J. Flowers & Bro., for repaing tools.....	75
	“ Robert Fox, for repairing tools.....	2 41
	“ Peter Deslisle, for straw.....	1 00
		<hr/> \$2,057 04

For Reservoir.

Feb. 1.	Paid J. L. Muth, for repairing house.....	\$33 35
April 10.	“ James Melross, for moving barn.....	15 00
May 11.	“ Valentin Hilsendagen, for hinges and staples.....	3 25
June 9.	“ J. L. Muth for repairing barn.....	12 00
July 10.	“ T. J. Noyes, for lead pipe.....	17 77
Sept. 10.	“ J. L. Muth, for labor.....	17 00
	“ John Lauffer, for labor.....	3 77
Dec. 31.	“ J. L. Muth, for manuring sodding.....	35 00
	“ J. Brumaer, for labor.....	2 63
	“ M. McNamanar, for labor.....	3 00
		<hr/> 142 77
Total for expense and repairs.....		<hr/> \$14,543 01

*MISCELLANEOUS.**For Interest.*

Jan. 31.	Paid Michigan Insurance Bank for coupons.....	35 43
Feb. 29.	“ “ “ “ “.....	318 95
April 10.	“ “ “ “ “.....	19,224 85
	“ “ “ “ “.....	1,346 63
June 9.	“ “ “ “ “.....	248 05
July 1.	“ “ “ “ “.....	70 87
July 31.	“ “ “ “ “.....	53 15
Sept. 1.	“ D. P. Bushnell “.....	17 50
Sept. 11.	“ Michigan Insurance Bank “.....	20,713 96
Oct. 31.	“ “ “ “ “.....	1,151 73
Dec. 1.	“ “ “ “ “.....	655 59
		<hr/> 43,836 71

For Per Centage.

Paid Water Collector's am't, rec'd in office.....	932 56
	<hr/> 932 56

For Service Cocks.

April 10.	Paid T. J. Noyes, for solder, &c.....	\$ 4 75	
July 10.	" Jackson & Wiley, for repairing drills.....	2 50	
Sept. 10.	" Jackson & Wiley, for repairing drills.....	1 80	
Oct. 10.	" D. Guiney and others, for labor.....	60 00	
Nov. 10.	" S. Davis, for brass castings.....	57 00	
	" Jackson & Wiley, for drills.....	1 50	
	" T. J. Noyes, for solder.....	3 75	
Dec. 10.	" D. Guiney and others, for labor.....	60 00	
			<u>\$191 30</u>

For Water Certificates.

July 18.	Paid J. Humphrey, on old certificate.....	5 00	
			<u>5 00</u>

For Water Rates.

Feb. 1.	Paid M. W. Burchard, for rate refunded.....	1 18	
March 1.	" H. Langley, for rate refunded.....	4 00	
			<u>5 18</u>

For Dickerson & Sickles.

Feb. 1.	Paid Dickerson & Sickles, on engine.....	300 00	
March 10.	" " " " ".....	200 00	
			<u>500 00</u>
	Total miscellaneous.....		<u><u>\$45,470 75</u></u>

RECAPITULATION

*Of Receipts and Expenditures for the year ending December 31,
1860.*

R E C E I P T S .

Balance on hand January 1st, 1860.....	\$35,732 76
<i>Received,</i>	
For Water Rates.....	\$49,434 90
" Service-Cocks.....	328 00
" Per centage.....	887 73
" Shutting off.....	60 75
" Plumbers' Licenses.....	90 00
" Interest.....	3,187 08
" Iron Pipes.....	58 00
" Wood Distribution Pipes.....	569 91
" New Engine House.....	120 00
" New Reservoir.....	12 75
" Engine House.....	28 18
" Engineering.....	50 00
" Stop-Cocks.....	50 00
" Repairing Leaks.....	26 87
" Pipe Yard.....	15 00
" Bartholemew Hydrants.....	12 00
" Loan on Bonds.....	50,000 00
	<u>104,931 17</u>
	<u>\$140,663 93</u>

EXPENDITURES.

For Construction.

For Iron Pipe.....	\$2,007 19	
“ Laying Iron Pipe.....	1,389 90	
“ Stop-Cocks.....	2,156 87	
“ New Reservoir.....	6,389 79	
“ Engineering.....	461 85	
“ New Engine.....	230 88	
“ New Engine House.....	3,350 14	
“ Lead.....	133 34	
“ Inlet Pipe.....	4 35	
“ Water Meters.....	1 60	
“ Wood Distribution Pipe.....	2,231 58	
“ Pipe Yard.....	213 14	
“ Public Drinking Hydrants.....	2 25	
“ Fire Hydrants.....	384 73	
	<hr/>	\$18,957 61

For Expense and Repairs.

For Engine House.....	3,969 00	
“ Wood and Coal.....	4,192 73	
“ Repairing Leaks.....	2,057 04	
“ Office.....	4,181 47	
“ Reservoir.....	142 77	
	<hr/>	14,543 01

Miscellaneous.

For Interest.....	43,836 71	
“ Per centage.....	932 56	
“ Water Certificates.....	5 00	
“ Service-Cocks.....	191 30	
“ Water Rates.....	5 18	
“ Dickerson & Sickels, (on new engine,)..	500 00	
	<hr/>	45,470 75

Total expenditures in 1860.....\$78,971 37

Cash on Hand.

In Michigan Insurance Bank—special acc’t..	42,701 51	
“ “ “ “ gen’l “ ..	13,098 17	
“ “ “ “ wood “ ..	137 71	
“ Office.....	1,204 41	
“ Due from Ohio Life Insurance and Trust Co.....	2,550 76	
“ Bills receivable.....	2,000 00	
	<hr/>	61,692 56
		<hr/>
		\$140,663 93

STATEMENT

Of the amount of Receipts and Expenditures of the Board of Trustees and Commissioners, from March 1st, 1852, to December 31st, 1860.

RECEIPTS.

Per Annual Reports of Commissioner and Secretary	\$385,628 04	
Amount of Loans and Premium.....	653,471 58	
	<hr/>	\$1,039,099 62

EXPENDITURES.

For Construction.

Per Annual Reports\$584,464 25

For Expense and Repairs.

Per Annual Reports..... 128,280 95

Miscellaneous, (Interest, &c.)

Per Annual Reports..... 264,177 82

Balance on hand, Dec. 31, 1860..... \$976,923 02

Discrepancy in balance in 1852..... 61,692 56

484 04

\$1,039,099 62

STATEMENT

Of the amount and kind of Expenditures by the Trustees and Board of Commissioners in Re-constructing and Enlarging the Works, from March 1st, 1852, to December 31st, 1860.

FOR CONSTRUCTION.

For Iron Pipes.....	\$247,226 55	
“ Laying Iron Pipes, Excavating Trenches, &c.....	46,038 26	
“ Lead for Joints.....	19,178 79	
“ Hydraulic Press, for proving pipes.....	1,430 87	
“ Proving Pipes	5,648 01	
“ Railway, at wharf.....	177 69	
“ Stop-Cocks	28,851 19	
“ Inlet Pipe.....	9,374 42	
“ Cement Pipe.....	1 90	
Total amount expended for Iron Pipes,	\$357,927 68	
“ Wood Distribution Pipes.....	19,294 43	
Total amount expended for Main and Distribution Pipes		\$377,222 11
“ Fire Hydrants	10,894 55	
“ New Reservoir	116,362 81	
“ Reservoir Lot	7,363 39	
“ Grading Wharf.....	845 40	
“ Engineering	10,836 97	
“ Fireman's Building in exchange for office	1,349 15	
“ Tower and Tank.....	243 83	
“ Fence at Wharf.....	427 22	
“ New Engine.....	1,146 30	
“ New Engine House.....	56,466 94	
“ Public Drinking Hydrants.....	114 44	
“ Water Meters.....	1,191 14	
		\$207,242 14
Total for construction.....		\$584,464 25

For Expenses and Repairs.

For Engine House.....	\$37,947 51	
“ Wood	29,702 33	
“ Repairing Leaks.....	19,183 02	
“ Tower and Tank (old reservoir).....	1,303 68	
“ Office	38,601 24	
“ Repairing Wharf.....	1,292 26	
“ Repairing Cisterns	12 00	
“ Analysis of Water.....	84 01	
“ Reservoir	154 90	
	<hr/>	\$128,280 95

Miscellaneous.

For Outstanding water certificates issued by the Common Council.....	1,480 43	
“ Per Centage to Collectors.....	3,282 31	
“ Water Rates Refunded.....	55 69	
“ Service-Cocks	5,894 78	
“ Bartholemew Hydrants.....	359 75	
“ Cochrane Hydrant.....	29 12	
“ Interest.....	226,787 07	
“ City Treasurer.....	550 00	
“ Chollar, Sage & Dunham	72 00	
“ C. H. Ekloff.....	1,166 67	
“ Dickerson & Sickles (on new engine).. <hr/>	24,500 00	264,177 82
		<hr/> \$976,923 02

STATEMENT

*Of the total cost of the Water Works to the City over and above
receipts, to December 31st, 1860.*

Amount expended by the Common Council for con- struction, (incl. purchase of Old Works, \$19,800) to March 1st, 1852.....	\$181,015 93	
Amount expended by the Common Council for ex- pense and repairs, including interest, over and above receipts, to March 1st, 1852,.....	85,125 09	266,141 02
	<hr/>	
Amount expended by the Trustees and Commission- ers, over and above receipts, to Dec. 31st 1860,...		587,824 40
		<hr/>
		<hr/> \$853,965 42

STATEMENT

*Showing the amount of Water Rates received from year to year,
since the Works were purchased by the City.*

1838 } The aggregate amount received during these {	\$3,055 38
1839 } two years was \$6,110,76, being an average of. . }	3,055 38
1840 The amount received was.....	4,919 24
1841 “ “ “ “	4,465 44
1842 “ “ “ “	6,722 05
1843 “ “ “ “	6,038 72

1844	The amount received was.....	\$5,427 39
1845	" " " "	6,465 83
1846	" " " "	8,671 92
1847	" " " "	10,191 13
1848	" " " "	9,311 41
1849	" " " "	6,482 37
1850	" " " "	9,825 21
1851	" " " "	15,117 35
1852	" " " " " to May 1st, 1852.*.....	13,405 58
1853	" " " " " to Dec. 1st, 1852, 7 mos.	25,482 84
1854	" " " " " to Dec. 31, 1853, 13 mos.	27,290 58†
1855	" " " "	34,192 80†
1856	" " " "	26,064 09†
1857	" " " "	37,666 25
1858	" " " "	40,942 20
1859	" " " "	48,779 04
1860	" " " "	49,434 90
		<hr/>
		\$403,011 10
		<hr/>

History and Description of the Works.

The re-construction and enlargement of the works, which have been in progress for the past seven years, may now be regarded as completed, with the exception of the new pumping engine, which, although constructed and set up, has not been accepted and brought into service, and it may not be deemed out of place here to give a brief sketch of the history of supplying the city with water, and a description of the works.

HISTORY.

The soil upon which the city is built, is underlaid by stiff impermeable clay, extending down to a rock base, and there is not within the limits of the city a well supplied with water from what can be termed a spring, but what few wells there are, are supplied with surface water, which has been found, by analysis, to contain one hundred and sixteen grains of organic matter to a gallon, a great part of which matter is cathartic in its properties.

The present site of the city was occupied by Indian villages at the period of the discovery of the country, in the year 1610. The legiti-

*The Works at this time were placed under the management of the Board.

†The fiscal year ends with the calendar year, and the assessments end July 1st of each year. The amount collected in the last part of the fiscal year of 1855 of the assessments for 1855-6, was unusually large, while the amount collected, in the last part of the fiscal year of 1856, of assessments of 1856-7, was unusually small,—for reasons heretofore given—thus materially lessening the amount received in 1856, and swelling the amounts for 1855, and 1857.

mate settlement of the city, by a white population, was in 1701. To the natives and early settlers, as well as the present inhabitants, the river which rapidly sweeps past the city was the unfailing source of the supply of water, which was conveyed to their dwellings in casks, hauled in carts, and in buckets slung at either end of wooden yokes which were borne on the shoulders by male and female. The want of a distribution throughout the city of an ample supply of so great an element of life, and comfort, as pure and wholesome water, which is so essential to the health and prosperity of any city, and also to the security and protection of life and property against fire, had long been felt, and the project of supplying the inhabitants with water by means of water works was agitated at an early day. But nothing decisive was done until 1825, when works were commenced by individual enterprise, and in 1827 the citizens were first supplied with water from them, a company was subsequently organized, who made an effort to obtain a supply of water by boring, and sunk a pipe to the depth of two hundred and sixty feet, and failing to obtain water, the project was abandoned. This company continued to extend their works and made every effort to supply the inhabitants with water in the face of pecuniary loss and the complaints of the public until 1836, when the city purchased the works, and at once projected new works on a larger scale, and their construction was commenced in 1837, which were completed and brought into use in 1841. From this time until 1852, no important improvement or addition had been made to the power or capacity of the works to supply, except an additional engine, while wooden logs had been extended in all directions to an almost indefinite extent, and the nine miles of wood pipe originally laid had increased to thirty-five miles.

These were principally of two inch bore, and generally connected with a five-eighths of an inch lead pipe, and the receipts from water-rates during this time, fell short of meeting the current expenses, and interest, over \$85,000. For several years there had been many complaints of an irregular and insufficient supply of water, and it was evident to all that the requirements of the city had outgrown the capacity of the works to supply, and to provide for the future wants of our rapidly growing city, works were required to be constructed on a much larger scale. When the control of the works were placed under their present management, which, in 1853, projected and commenced the re-construction and enlargement of the works on a scale

commensurate with the rapid growth of the city, and sufficient to meet the demand that might be made upon them, to supply at least three times the then present population, a brief description of the work accomplished is as follows :

NEW RESERVOIR.

Four acres of land upon the Mullett farm, between Russell and Prospect streets, north of the Gratiot road, had been purchased by the Common Council in 1851, for the purpose of erecting thereon a new reservoir, which had been, with the other property, transferred to the Board. But the commissioners foreseeing the probable necessity at an early day of a more extensive system of supply, as the population of the city should increase, and after careful examinations and surveys in 1854, purchased ten acres of land on the Dequindre farm, north of the Gratiot road, about one and a half miles from the river, being the highest accessible point of land in the vicinity of the city, for the purpose of constructing the distributing reservoir thereon. The cost of the land was \$7,363, and it was expected that the lot on the Mullett farm would sell for an amount that would reimburse them for this outlay. The construction of the reservoir was commenced that year, and so far completed as to be brought into use in the fall of 1857, but it was not fully completed until the past season.

The reservoir is constructed in two basins, by raising earth embankments to a height of thirty feet. The embankments are one hundred and three feet through at the base, and fifteen feet at the top. The slopes of the embankment are one and a half feet to one. The inside slopes are lined with a heavy stone wall, topped out with brick. The outside slopes are sodded, a flight of stone steps is built on the inside slope of either basin, from the top of the division embankment to the bottom, a flight of stairs is built on the west side of the reservoir, from the grounds outside, to the top of the terrace; the terrace is graveled and a fence is constructed on the inner side around the basins, and on the outer side a hedge of white cedar has been set. Either basin is two hundred feet square at the top, and one hundred and fourteen and a half feet at the bottom; the two basins cover nearly four acres. The total storage capacity of the two basins is 10,000,000 United States standard gallons. The top water line is

fifty feet above the intersection of Jefferson and Woodward avenues, and seventy-seven and a half feet above the river. The esplanade on the top of the reservoir, which is fifteen feet wide and one thousand three hundred feet around the basins, affords a commanding view of the city and surrounding country, and is a delightful promenade for health and pleasure. The water is forced by steam power from the river into the reservoir, through an iron pipe, twenty-four inches interior diameter, and from thence distributed to the inhabitants by an iron pipe twenty-four inches interior diameter, extending from the reservoir directly to Woodward avenue, connecting with distribution pipes of smaller size at different points. The large main is to extend to Cass avenue and connect with a ten inch pipe leading to the ten inch pipe in Michigan avenue, which, when done, will materially increase the effective head of water throughout the city. An eight inch iron pipe also leads from the reservoir down Orleans street connecting with all pipes on the line to Jefferson avenue. A twenty-four inch pipe is laid through the division embankment of the reservoir, thus connecting the two basins, and will serve to equalize the height of water in them; pipes are also extended through the embankments on the north side of the reservoir provisionary to supply of water to an additional reservoir. Stop-cocks are set in the pipes passing through the embankments, in stone vaults constructed in the embankment, which are reached from the top of the embankment by ladders in chimneys. A waste pipe, a clearing pipe, and a sewer, are laid in the embankment, which is connected with a sewer extending to the Russell street sewer. The average daily consumption of water during the past year, was 2,383,661 gallons, having nearly doubled within the past five years. The capacity of the reservoir, it will be seen, is more than four times this amount. The net cost of the reservoir was \$116,287.58, and including the cost of the lot, \$123,650.97. The keeper of the reservoir resides on the premises, and the gates are opened to visitors at proper hours, under proper regulations during the summer season.

NEW ENGINE HOUSE, BOILER ROOM AND CHIMNEY.

The new engine house, boiler room and chimney, are erected on the river side of the old engine house on the wharf, foot of Orleans street. The engine house is forty-six by twenty-three feet on the ground, the

elevation from surface of ground is sixty-five feet, the extreme interior height from the bottom of the well to the roof is seventy-three and a half feet, from the bottom of the well to the water table is fourteen feet, and to the floor of the engine room is twenty-nine feet, and from the floor of the engine room to the ceiling is forty-four feet. The section of the building below the engine house floor, comprising the pump room and well, is constructed of stone, very solid and massive. The foundations of the whole structure, and the division walls in the well are of massive blocks of stone, five feet in thickness, resting upon two courses of oak timbers, one foot square, running at right angles, resting upon solid sheet piling, driven as far as possible, varying in depth from twelve to fifteen feet. The whole forms the most solid and substantial foundation it was possible to make. The first story from the water table to the floor of the engine room is entirely of cut stone, the outer walls are two and a half feet in thickness, and the centre wall supporting the heavy machinery above is five feet thick, of solid stone. The walls of the engine room above the floor are of brick, two feet in thickness, firmly bound together with iron rods and bands. The external appearance of the building represents a building of three stories, though the interior is clear above the first story and is wholly occupied by the engine. The front of the building is relieved by an entrance extending across two-thirds of the front, which furnishes two entrances to the building, between which is a close room, for the protection of the pipe leading from the pump to the reservoir. The windows throughout the building are all full length, reaching to the floors, and have semi-circular eaps of stone, with stone casings and sills. The whole building throughout is perfectly fire proof, the wooden sash and doors being the only wood that enters into its construction. The stone and iron floors are supported by iron girders. Close beside this building, and connected with it by a door, in the centre of the engine room, is the

BOILER ROOM.

This building is fifty-six by twenty-five feet on the ground, and twenty-eight feet in height, internally presenting but one story, though externally appearing like a two story structure; like the en-

gine house, it is perfectly fire proof in every respect, the windows and doors furnishing the only wood work found about it. The walls are of brick, sixteen inches in thickness. Eight and a half feet from the south-west corner of this building, and connected with it by a flue, stands the

STACK OR CHIMNEY,

Consisting of a base and shaft, the whole stretching to a height of one hundred and twenty-eight and a half feet. The first section or base is sixteen feet square and twenty-seven and a half feet in height, surmounted with a stone cap. The sides contain a single pannel. The exterior of the shaft is octagon, fourteen and a half feet across at the base, and gradually tapering to ten and a half feet in width at the top. It is one hundred and one feet in height and is surmounted by a heavy iron cornice. The interior is circular in form, and five feet diameter throughout its length. The interior wall is twelve inches in thickness, between which and the wall is an annular air space of five inches, designed to prevent the radiation of heat, and thus to perfect the draft of the chimney. The interior and exterior of the shaft is furnished with flat iron staples or steps, extending the length of the shaft, for the purpose of access to the top. This stack is one of the most beautiful and admirable structures of the kind in the country, completely adapted for the purpose for which it is intended. The face of the walls of the buildings and stack are laid with red pressed brick. The entire cost, in round numbers, of the buildings and stack, including the iron stairs, columns and entablatures in the engine house, and cast iron settings and mason work for setting the boilers, is \$56,000. The pump well in the engine house is supplied with water by an

INLET PIPE,

Of thirty inches interior diameter, made of heavy boiler iron, extending into the river one hundred and fifty feet, the outer end being covered with a double strainer to prevent the passage of any chance floating substance. This end is sunk thirty feet below the surface of the river directly in the channel bed, where the freshest and purest

water flows, and entirely beyond the influence of the shore washings. The pipe is protected by a row of piles on either side, filled in with stone. The cost of the pipe and getting it in place was \$9,374.42.

MAIN AND DISTRIBUTING PIPES.

The total pipeage in the city is sixty-three miles four thousand seven hundred and sixty-nine feet, varying in size from two and a quarter to thirty inches interior diameter, of which thirty-eight miles four thousand eight hundred and sixty-seven feet are iron pipes, and twenty-four miles five thousand and one hundred and eighty two feet are wooden logs, of which there was laid by the Board of Commissioners thirty-four miles two thousand two hundred and twenty-seven feet of iron pipe, and sixteen miles two thousand three hundred and twenty-six feet of wooden logs. Total, fifty miles four thousand five hundred and fifty-three feet, at a total cost, in round numbers, of \$377,000.

The whole number of fire hydrants set up is two hundred and forty-five, and the whole number of street reservoirs supplied with water from the works, is one hundred and eleven.

The population of the city and the capacity of the reservoirs constructed at the different periods, were as follows:

YEARS.	POPULATION.	CAPACITY OF RES- ERVOIR. GALLONS.
1827,-----	2,000	12,010
1830,-----	2,222	22,800
1840,-----	9,100	353,430
1860,-----	60,000	10,000,000

When each of the above reservoirs were constructed, they were deemed ample to supply the inhabitants, and that of 1840 was supposed to make ample provision for the generation to come, and much caution was exercised lest it should be constructed on too large a scale,

at which time it was predicted by some that the city would contain a population of 20,000 within the life-time of some then living; and now, in twenty years, the population has trebled that number, and at the same ratio of increase, the reservoir now constructed will be insufficient to supply the city in less than that number of years. In the construction of water works for cities, their size and capacity are never over-estimated.

Detroit has now a perfect and economical system of distribution of an abundant supply of water throughout the city. The works being constructed on a scale far greater than the present requirements of its inhabitants, but little more will be required to be done for many years to come, except to extend the distribution pipes, as they may be required, to meet the demand by the extension of the settled limits of the city. The source of supply is unfailing, and the water, which is procured from the beautiful river which sweeps rapidly past the front of our city, drawn from the great northern chain of lakes, is found, by analysis, to be as pure and free from all deleterious substances as any in the world.

The citizens of Detroit have always manifested a deep interest in the construction of these works, to whom all credit is due for the free and glad offering of an enlightened and generous popular patriotism that dictated the construction, and who sanctioned by their approval the heavy outlays necessary for their erection.

The growth and prosperity of any city, whatever its natural advantages otherwise, and however enterprising may be its inhabitants, are largely dependent on the character and purity of the water consumed by its inhabitants, and the abundance of supply. For the diseases, common to large communities, are in a great degree aggravated or mitigated by the quality of the water consumed, and the convenience and comfort of citizens is dependent, in a great degree, on a free and abundant supply. While, for many branches of mechanical and manufacturing pursuits, a large supply of water is indispensable, and without which they could not be established in cities, and however accessible a supply of water may be from wells in densely populated cities, works to supply the inhabitants with water from some large body is indispensable, rendered so by the numerous excavations in the earth for sewers, drains, &c., making it possible

for filthy matter to find its way into the sources which supply the wells.

The cost of works of this character must be always large, but none murmur at this when they contemplate the many blessings it brings—the domestic comforts—the protection afforded from the destructive flame—to what degree the ravages of disease have been, and will be restrained, through the universal facilities for cleanliness, personal and municipal, afforded by them.

The annual receipts, from the easy rates fixed by the Commissioners, already amount to about fifty thousand dollars, and should the increase for the future be in the same ratio of the past eight years, we have an assurance that the investment will be remunerative in dollars and cents, as it has and will in so many other more momentous ways.

The Detroit Water Works will bear favorable comparison with other works of like capacity and character, as will be seen by reference to the annexed table.

All of which is respectfully submitted.

ROBT E. ROBERTS,

Secretary.

princ

Ratio of Receipts to cost of Work	
Per cents	
1	6.5
5	5.2
3	5.8

6	8.86
4	9.46
2	9.8
4	5.22
3	4.27
4	6.03

3	7.43
0	8.22
0	2.87
3	15.73
3	4.77
0	2.14

0	5.33

00, which is

TABLE

Showing the cost, the extent of Works, the supply of water furnished, the Receipts and Expenditures, and other characteristics of the

CITIES.	COST AND EXTENT OF WORKS.				SUPPLY AND REVENUE.									
	Cost.	Capacity of Reservoir.	Extent of Pipe.	Power.	Average Daily Supply of Water.	Annual Receipts	Average Daily Receipts.		Receipts for each 1000 Gallons.		Annual Receipts for each Mile Pipe.		Ratio of Receipts to cost of Works.	
	Dollars.	Gallons.	Miles.		Gallons.	Dollars.	Dollars.	Cents.	Cents.	Mills.	Dollars.	Cents.	Per centage.	
ALBANY,-----	921,892	210,000,000	46½	Gravity.	2,500,000	78,490	215	04	8	6- $\frac{1}{100}$	1,687	95	8.51	
BOSTON,-----	5,500,000	80,000,000	130	Gravity.	15,000,000	316,290	866	54	5	7- $\frac{7}{100}$	2,433	00	5.75	
BUFFALO,-----	530,000	13,000,000	32	Steam.	3,000,000	50,000	136	98	4	5- $\frac{6}{100}$	1,562	50	9.43	
BROOKLYN,-----	5,000,000	170,000,000	170	Steam.	-----	-----	-----	-----	-----	-----	-----	-----	-----	
CHICAGO,-----	1,000,000	1,500,000	85	Steam.	3,000,000	123,600	338	63	11	2- $\frac{87}{100}$	1,454	11	12.36	
CINCINNATI,-----	1,359,000	5,000,000	74	Steam.	4,618,000	180,000	493	15	10	6- $\frac{78}{100}$	2,432	43	13.24	
CLEVELAND,-----	526,000	6,000,000	22	Steam.	1,000,000	13,824	37	87	3	7- $\frac{87}{100}$	628	36	2.62	
DETROIT,-----	*683,000	10,000,000	61	Steam.	2,142,000	48,779	133	64	6	2- $\frac{39}{100}$	799	65	7.14	
HARTFORD,-----	427,000	8,000,000	26	Steam.	785,000	26,000	71	23	9	0- $\frac{73}{100}$	1,900	00	6.08	
JERSEY CITY,-----	850,000	60,000,000	29	Steam.	2,000,000	69,245	189	70	9	4- $\frac{85}{100}$	2,387	75	8.14	
LOUISVILLE,-----	820,000	10,000,000	23	Steam.	-----	-----	-----	-----	-----	-----	-----	-----	-----	
MOBILE,-----	300,000	1,250,000	16	Gravity.	250,000	32,500	89	04	35	6- $\frac{16}{100}$	2,031	25	10.83	
NEW ORLEANS,-----	1,400,000	-----	56	Steam.	6,000,000	140,000	383	56	6	3- $\frac{93}{100}$	2,500	00	10.00	
NEW YORK,-----	23,500,000	175,000,000	267	Gravity.	30,000,000	750,000	2,034	79	6	8- $\frac{49}{100}$	2,803	98	3.19	
PHILADELPHIA,-----	3,000,000	67,000,000	306½	Water & Steam	19,638,000	551,000	1,509	58	7	6- $\frac{87}{100}$	1,799	51	18.36	
PITTSBURGH-----	900,000	6,600,000	27	Steam.	4,075,000	69,000	189	04	4	6- $\frac{39}{100}$	2,555	55	7.66	
RICHMOND,-----	654,000	10,000,000	31	-----	2,000,000	32,000	87	67	4	3- $\frac{83}{100}$	1,032	25	4.89	
ST. LOUIS,-----	1,800,000	45,000,000	-----	Steam.	8,000,000	-----	-----	-----	-----	-----	-----	-----	-----	
TROY,-----	216,000	1,000,000	-----	Gravity.	1,468,000	23,770	65	12	4	4- $\frac{35}{100}$	-----	-----	11.00	
WASHINGTON,-----	2,800,000	170,000,000	16½	Gravity.	-----	-----	-----	-----	-----	-----	-----	-----	-----	

* The value of so much of the old works, as is now in use, is \$94,000, and

Principal Water Works in the United States, compiled from Reports for 1859, and other sources.

Ratio of Net Receipts to Cost of Works.	Ratio of Net Receipts to Cost of Works.	EXPENSES.								MANAGEMENT.	
		Annual Expenses.	Average Daily Expenses.		Expenses for each 1000 Gallons delivered.		Annual Expenses for each mile of Pipe.		Ratio of expenses to Receipts.	Ratio of expenses to cost of Works.	
Per centage.	Per centage.	Dollars.	Dollars.	Cents.	Cents.	Mills.	Dollars.	Cents.	Per centage.	Per centage.	
6.59	6.59	17,693	48	47	1	9 $\frac{35}{100}$	380	49	22.54	1.92	By Water Commissioners.
5.22	5.22	29,038	79	69	-----	5 $\frac{31}{100}$	223	75	9.10	53	By Water Board.
5.85	5.85	19,000	52	05	1	7 $\frac{35}{100}$	593	75	38.00	3.58	By Private Corporation.
8.86	8.86	35,000	95	89	3	1 $\frac{25}{100}$	411	76	28.31	3.50	By Water Commissioners.
9.49	9.49	51,000	139	72	3	0 $\frac{25}{100}$	689	18	28.33	3.75	By Trustees.
98	98	8,623	23	62	2	3 $\frac{62}{100}$	391	95	62.37	1.64	By Trustees.
5.22	5.22	13,097	35	88	1	6 $\frac{75}{100}$	214	70	26.84	1.92	By Water Commissioners.
4.27	4.27	7,771	21	29	2	7 $\frac{12}{100}$	298	88	29.88	1.81	By Water Commissioners.
6.03	6.03	18,000	49	31	2	4 $\frac{65}{100}$	620	69	25.99	2.11	By Water Commissioners.
7.43	7.43	10,200	27	94	11	1 $\frac{76}{100}$	631	25	31.38	3.40	By Private Corporation.
8.22	8.22	25,000	68	49	1	1 $\frac{41}{100}$	446	43	17.85	1.78	By Private Corporation.
2.87	2.87	75,000	205	48	-----	6 $\frac{81}{100}$	280	87	10.00	32	By Commissioners.
15.73	15.73	79,000	216	43	1	1 $\frac{2}{100}$	257	75	14.33	2.63	By Chief Engineer.
4.77	4.77	26,000	71	23	1	7 $\frac{48}{100}$	962	92	37.68	2.89	By Committee of Common Council.
2.14	2.14	18,000	49	31	2	4 $\frac{65}{100}$	584	64	56.25	2.75	
5.38	5.38	12,141	33	92	2	2 $\frac{62}{100}$	-----	-----	51.07	5.62	By Water Commissioners.
											Works not completed.

which is included in the cost.

ANNUAL ASSESSMENT REPORT
OF THE
Secretary of the Water Works.

OFFICE OF WATER WORKS,

DETROIT, July 10, 1860.

To the Board of Water Commissioners of the City of Detroit :

GENTLEMEN:—The annual assessments of the rates to be charged for water for the year commencing July 1, 1860, have been made, and a recapitulation of the same, together with statistical facts collected while canvassing the city, are herewith respectfully submitted :

The aggregate amount of the rates assessed is \$56,969—being an increase of \$1,063 over last year; of \$20,785 in the last five years; and of \$37,213 in the past eight years, or since the works were placed under the management of the Board. The number of families now supplied with water from the works is 6,950—being an increase over last year of 156 families, and an increase within the past five years of 1,668 families. The whole number of families in the city not supplied with water from the works is 2,033, most of whom reside in districts not accessible to the distribution pipes at present laid. Some of them obtain their supply directly from the river, but most of them obtain it from wells, generally but scantily supplied by surface drainage. There is not within the limits of the city what can really be termed a spring, for the surface of the earth is underlaid by stiff impermeable clay, extending down to a rock base. Of the water found in these wells, Prof. Douglass, who analyzed it, says: "The large quantity of sodium (common salt), chloride of potassium, and magnesium found in it clearly indicates its surface origin. The two last salts are cathartic in their properties, and the habitual use of water holding them in solution, in any considerable

quantities, must prove injurious to health." A gallon of the well water he found to contain 116 grains of solid matter, while the water from the works he found to contain but a fraction more than five grains, "composed mostly of silica, alumina, and iron, elements that could produce but little or no injury; while the chlorides, much the most injurious compounds, are entirely absent." Nearly all who procure water from these wells, as also those who are now compelled to procure it directly from the margin of the river, subject as it is to the shore washings and drainage of a populous city, would gladly procure it from the works now, and will do so whenever distributing pipes are extended accessible to their premises.

Now that the construction of the works is nearly completed,—I mean as to the power to supply and capacity of storage of water,—which are constructed on a scale sufficient for at least three times the present population of the city, I deem it proper to call your attention to the necessities for the extension of distributing pipes, as the only means upon which you have to rely to make the works self-sustaining, as fast as you may be satisfied it will be remunerative and your means will permit. The extension of water pipes has not, for the past few years, been commensurate with the growth of the city. This could not be done for the want of power to supply and capacity of storage of water. While there are 1,668 more families *supplied* with water from the works than there were five years ago, there are 977 more families in the city *not supplied* from the works than there were at that time. There were about 900 families added in 1857 by the extension of the geographical limits of the city, and the number has increased within these limits since that time about 500. The growth of the city by territorial extension merely, is not, however, that "growth" which results from the combination of capital and industry by which wealth and production is actually increased and geographical limits enlarged by necessary distension, but, on the contrary, imposes municipal burdens for its maintenance, of which the water-works are necessarily obliged to contribute its proportion of unremunerative expenses, in laying long lines of pipes for few water-takers, instead of short lines for many consumers.

A very large number of families reside in districts too sparsely settled and too remote from the water pipes to justify the expectation of supplying them from the works at present, but there are now

several localities within the city limits, some of them central and in close proximity to pipes now laid, where the population is nearly as dense as it probably ever will be, where the inhabitants are entirely destitute of wholesome water, where it would be remunerative to the works and sanitary in its effects to extend the pipes. At first, it may be that all would not take the water, but a sufficient number would to pay a fair per centage on the cost, and eventually all would be compelled to, as past experience in similar localities fully demonstrates, when the amount received from rates would be largely remunerative on the investment. In some of these localities the inhabitants procure a partial supply of water from the works now, by trespassing on the nearest premises supplied, while but little if any revenue is derived therefrom. By extending pipes into these districts they would be compelled to connect service pipes with their respective premises and pay the rates assessed, for they would no longer have an apology for doing otherwise.

It is estimated that the receipts from water rates the present year will be sufficient to pay the interest on the liabilities incurred for constructing the works and annual current expenses, but they should do more than this. They should not only pay the annual liabilities, but leave a surplus sufficient for the future gradual extension of distributing pipes, and a sum annually to go into a sinking fund to provide for the ultimate extinguishment of the debt incurred; but I do not consider any advance in the present established rates for water necessary, believing that they are sufficient to meet all of the liabilities *properly* belonging to the works, and that you may confidently rely upon the increase of receipts from the increased uses of water from the lines of pipe, now laid, and that you may hereafter deem proper to lay, from time to time, for the surplus desired.

The annual current expenses were greatly augmented while the work of construction was going on, but now that the works are about completed, and the current expenses hereafter will be confined to supplying water and maintaining the works, they should be proportionately lessened.

A large amount of the cost of construction and annual current expenses are properly chargeable to other branches of the municipal government—Fire Department and Poor Funds—the burden of which should not be borne by the water-takers, but by the city at

large, for a large amount of property to which fire protection is afforded does not contribute to the revenue of the works, and it will be conceded that the poor should be thus maintained. It is true that about fifty thousand dollars' valuation of the old works will remain, the interest upon which is paid by the city, but this is not by any means equal to the proportionate cost of the works and annual cost of supplying water, which is now paid exclusively by water-takers. In my assessment report for 1857, I stated that the interest on the cost of what would remain of the old works would defray the expense of supplying the water to the Fire Department, but that had no reference to the cost of the works.

Besides the proportionate cost of the power to furnish a supply of water, there has been paid for fire hydrants, and iron pipes to connect them and the reservoirs, about forty thousand dollars, and, besides the proportionate cost of supplying water, one man is kept constantly employed examining and keeping the hydrants in working order. Whenever a hydrant or gate is broken, it is repaired or replaced at the expense of the works, thus increasing the current expenses about six hundred dollars annually. The annual amount which is now paid by water-takers, and which should properly be paid by the city, besides the proportionate amount for the cost of the power to supply, and supply of water, is as follows:

For annual interest on \$40,000.....	\$2,800
For annual expense of keeping hydrants, &c., in order.....	600
For annual expense of supplying the poor with water.....	1,000
Total.....	<u>\$4,400</u>

To which should be added the proportionate amount of the interest on the cost of the power to supply, and for the supply of water furnished for fire purposes.

The whole number of families in the city is 8,973, being an increase over last year of 206 families. Since the works were placed under the management of the Board, eight years ago, besides relaying 19 miles of distribution pipes, 29½ miles of water pipes have been added. The total pipeage in the city, January 1st last, was 61 miles and 565 feet. 3,265 more families are supplied with water from the works, and the annual amount of the assessed rates has increased \$31,585.

The number of unoccupied buildings in the city at the time the canvass was made, was as follows: 66 dwellings, 34 stores, and 3 taverns, many of which were vacated for the purpose of being repaired. The number of buildings constructing at the same time was as follows: 75 brick and 101 wooden dwellings—176 dwellings, 59 brick stores, 3 brick and 1 stone churches—4 churches, 2 brick public school houses, 2 brick machine shops, 2 brick additions to taverns, 1 brick house of correction, 1 public market, and 1 brick tannery; the aggregate cost of which is \$560,000.

The recapitulation of the assessments and statistical tables are hereto appended.

ROBERT E. ROBERTS,

Secretary,

RECAPITULATION OF ASSESSMENTS OF WATER RATES, AND STATISTICAL TABLES.

SUPPLIED AND RATED.

	First Ward.	Second Ward.	Third Ward.	Fourth Ward.	Fifth Ward.	Sixth Ward.	Seventh Ward.	Eighth Ward.	Ninth Ward.	Tenth Ward.	Totals.
Amount of Assessments.....	6772	4952	6306	7095	7248	7160	8015	5902	1960	1529	\$56,969
Number of Families.....	654	195	676	980	1013	931	1223	887	202	189	6,950
Stores.....	34	217	42	4	38	25	7	2	1		370
Taverns.....	15	9	9	1	5	3		3			44
Grocery and Provision Stores.....	39	43	34	21	38	27	51	40	13	4	310
Offices.....	22	200	9		5	4					240
Mechanic Shops.....	53	169	98	48	76	53	34	21	5	4	561
Iron Machine Shops.....	2	1	2	2	1						9
Iron Foundries.....	2	1	2	2	2						9
Boiler Manufactories.....	2			1						1	4
Locomotive Works.....	2										1
Brass Foundries.....	3	1	1								5
Steam Planing, Door, Sash, Blind and Furniture Manufactories.....	1		2		4		2	1			10
Saw Manufactories.....			2								1
Flour Mills.....	1	1		2	1	2					7
Saw Mills.....							1			1	2
Plaster Mills.....			1								1
Tanneries and Morocco Factories.....			1	1	1		3	1			7
Steam Tobacco Factories.....	1	3	2								6
Soap and Candle Factories, and Asheries.....		1	1	4	2	2			2		12
Stone and Marble Works.....	1	2	2		1	2					8
Railroad Depots.....	2		2	1							5
Livery and Omnibus Stables.....	4	6	3		1	3					17
Breweries.....	3	1	3	3		3	8	4	1	2	28
Malt Houses.....	2	2	1					1			6
Bakeries.....	5	2	4	7	2	4	5	2			31
Gas Works.....								1			1
Dye Houses.....		1	2	2						1	6
Soda and Small Beer.....	1										1
Printing Establishments.....		8	1		1	1					11
Public Halls.....	1	3				1					5
Churches.....	6	7	5	4	1	3	5	2			33
Banks.....		5									5
Theatres.....			1				1				2
Jail.....			1								1
Orphans' Homes.....		1	1							1	3
Hospitals.....				1						1	2
Public Schools.....	3		1	3	12	15	10	11	4	3	62
Private Schools.....	4	3	3	2	1	2	3	1			19
Fire Engine Houses.....	2	4	2		1	1	1	1			13
Public Markets.....		1									1
Private Meat Shops.....	6	4	7	7	7	8	12	5	4	2	62
Stationary Steam Engines.....	10	10	9	5	7	2	3	2		2	50
Piano Forte and Melodeon Manufactories.....			1			1					2
Public Batting Establishments.....	1	2	1								4
Rectifying Distilleries.....	3	2			1	1	1	1			9
Vinegar Factories.....	2	4		1			1	1			9
Brush and Broom Factories.....		1									2
Boarding Houses.....	25	13	29	13	6	9	8	4			107
Bars for Retail of Spiritous Liquors, Wine and Beer.....	80	61	80	73	40	31	85	55	14	12	531
Rail Car Manufactories.....	1									1	2
Last Manufactories.....		1	1								2
File Manufactories.....			1	1							2
Lime Kilns.....							1				1
R. R. Cattle Yards.....									2		2
Cutlery and Edge Tool Factory.....			1								1
Packing House.....		1									1

NOT SUPPLIED.

	First Ward.	Second Ward.	Third Ward.	Fourth Ward.	Fifth Ward.	Sixth Ward.	Seventh Ward.	Eighth Ward.	Ninth Ward.	Tenth Ward.	Totals.
Number of Families.....	20	13	13	34	33	529	161	207	424	589	2,023
Stores.....	2	12	2	.....	1	.....	.....	.....	1	12	20
Taverns.....	.....	.....	.....	.....	.....	.....	.....	.....	3	3	5
Grocery and Provision Stores.....	3	3	3	4	1	3	6	5	6	8	42
Offices.....	5	5	5	.....	.....	.....	.....	.....	.....	.....	15
Mechanic Shops.....	10	15	5	6	2	7	23	2	12	33	115
Iron Machine Shops.....	.....	.....	1	.....	.....	.....	1	.....	.....	1	3
Iron Foundries.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	2
Boiler Manufactories.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2
Brass Foundries.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Steam Planing, Door, Sash, Blind and Furniture Manufactories.....	.....	.....	.....	1	.....	.....	.....	.....	.....	3	4
Saw Mills.....	.....	.....	.....	.....	.....	.....	.....	.....	4	3	7
Tanneries and Morocco Factories.....	.....	1	.....	.....	.....	.....	2	1	2	2	8
Stone and Marble Works.....	1	.....	2	.....	.....	.....	1	.....	.....	.....	4
Potteries.....	.....	.....	.....	1	.....	.....	.....	.....	1	1	3
Lim Kilns and Stone Yards.....	1	2	.....	1	.....	2	10	.....	.....	2	18
Breweries.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	3
Malt Houses.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Private Meat Shops.....	.....	.....	.....	.....	.....	2	.....	.....	.....	3	27
Forwarding Houses.....	17	8	2	.....	.....	.....	.....	.....	.....	.....	27
Wheat Elevators.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	2
Stationary Steam Engines.....	1	1	1	2	.....	.....	7	1	8	9	30
Rope Walk.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
Bars for Retail of Spiritous Liquors, Wine and Beer.....	8	6	3	6	.....	15	13	5	8	30	94
Coal Yards.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	4
Glue Factories.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Tub and Pail Factories.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Steam Match Factory.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Ship Yards.....	.....	.....	.....	.....	.....	.....	1	.....	1	1	3
Dry Docks.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	2
Asheries.....	.....	.....	.....	1	.....	.....	1	.....	1	.....	3

Statistics of the City of Detroit for the years 1855 and 1860,

And showing the increase in five years.

	1860	1855	Incr'se in 5 years.
Number of Families.....	8973	6328	2645
Stores.....	390	335	55
Taverns.....	49	49	.....
Groceries and Provision Stores.....	353	260	93
Offices.....	255	175	80
Mechanic Shops.....	676	343	333
Iron Machine Shops.....	11	10	1
Iron Foundries.....	11	7	4
Boiler Manufactories.....	6	4	2
Locomotive Works.....	1	1	.....
Brass Foundries.....	7	6	1
Steam Planing, Door, Sash, Blind and Furniture Manufactories.....	14	12	2
Saw Manufactories.....	1	1	.....
Flour Mills.....	7	3	4
Saw Mills.....	9	6	3
Plaster Mills.....	1	1	.....
Tanneries and Morocco Factories.....	15	9	6
Soap and Candle Factories, and Asheries.....	13	9	4
Stone and Marble Wo. ks.....	12	10	2
Potteries.....	3	2	1
Lime Kilns and Stone Yards.....	18	6	12
Railroad Depots.....	5	2	3
Livery and Omnibus Stables.....	17	14	3
Breweries.....	30	17	13
Malt Houses.....	8	2	6
Bakeries.....	32	21	11
Gas Works.....	1	1	.....
Hydraulic Works.....	1	1	.....
Dye Houses.....	6	3	3
Printing Establishments.....	11	11	.....
Public Halls.....	5	4	1
Churches.....	33	27	6
Banks.....	5	4	1
Theatres.....	2	2	.....
Jail.....	1	1	.....
Orphans' Homes.....	3	2	1
Hospitals.....	2	1	1
Public Schools.....	62	26	36
Private Schools.....	19	24	.....
Fire Engine Houses.....	13	9	4
Public Markets.....	1	1	.....
Private Meat Markets.....	67	24	43
Forwarding Houses.....	27	24	3
Wheat Elevators.....	2	2	.....
Stationary Steam Engines.....	80	46	34
Piano Forte and Melodeon Manufactories.....	2	2	.....
Public Bathing Establishments.....	4	4	.....
Rectifying Distilleries.....	9	2	7
Vinegar Factories.....	9	.....	9
Rope Walk.....	1	1	.....
Brush and Broom Factories.....	2	.....	2
Boarding Houses.....	107	101	6
Bars for Retail of Spiritous Liquors.....	625	250	375
Coal Yards.....	4	1	3
Glue Factories.....	2	1	1
Tub and Pail Factories.....	1	1	.....
Rail Car Manufactories.....	2	1	1
Steam Match Factories.....	1	.....	1
Last Manufactories.....	2	.....	2
Steam Tobacco Factories.....	6	6	.....
File Factories.....	2	1	1
Ship Yards.....	3	2	1
Dry Docks.....	3	2	1
Railroad Cattle Yards.....	2	1	1
Cutlery and Edge Tool Manufactory.....	1	.....	1
Packing House.....	1	.....	1

WATER RATES.

PRIVATE FAMILIES.

For every family, consisting of not more than three persons, five dollars per annum; for every family of four persons, six dollars; for a family of five persons, seven dollars; for a family of six persons, eight dollars; for a family of seven or eight persons, nine dollars; for a family of nine and not more than ten persons, ten dollars, and one dollar for each additional person.

Bathing Apparatus, from two to five dollars.

Water Closets, from three to eight dollars.

Garden Hose and Street Sprinklers, from three to ten dollars.

Horse, one dollar and fifty cents. *Cow*, seventy-five cents.

Carriages, two horse, one dollar; one horse, fifty cents.

Fountains, special rates.

MISCELLANEOUS.

Stores, Offices and Shops, from two to twenty dollars.

Foundries, Machine Shops, Printing Offices, and other places where engines are used, one and a half cents per barrel, meter measure.

Breweries, Hotels, Boarding Houses, Fountains, Gas Works, Bakeries, Asheries, &c., one and a half cents per barrel, meter measure.

Livery Stables.—Each horse, one dollar; each carriage one dollar per annum, or one and a half cents per barrel, at the option of the Board.

Public Baths.—Each tub, five dollars per annum, or one and a half cents per barrel.

Gardens, without hose, special rates.

Building Purposes.—Each 1,000 brick, five cents; each perch of stone, one and a half cents, and each 100 yards of plastering, thirty cents.

The supply of water may be withheld from premises occupied by more than one family using water from the same hydrant, unless the owner of such premises pays the water rates assessed thereon; and where more than one assessment is made from water used from the same hydrant, on the neglect or refusal of any so assessed to pay the amount of their water rate, the water will be shut off from such hydrant.

IRON AND LEAD PIPE.

The calibre, area, thickness, and weight per foot of the Iron Pipes used, and the calibre, area and weight of the Lead Service-Pipe, allowed to be used on these works, are as follows:

IRON PIPES.				LEAD PIPES.				
Calibre Interior Diameter.	Area in inches.	Thickness	Weight per foot. lbs.	Calibre Interior Diameter.	Area.		Weight per foot.	
					In.	Dec.	lbs.	oz.
30 inches,---	706.86	$\frac{5}{8}$ inch	211.	2 inch strong	3.14	16	8	
24 inches,---	452.39	$1\frac{3}{8}$ inch	222.	medium	-----		7	
18 inches,---	254.46	$\frac{5}{8}$ inch	126.	$1\frac{1}{2}$ inch strong	1.76	71	6	4
12 inches,---	113.09	$\frac{5}{8}$ inch	77.5	medium	-----		5	4
10 inches,---	78.54	$\frac{5}{8}$ inch	65.	1 inch strong	.78	54	4	
8 inches,---	50.26	$\frac{5}{8}$ inch	52.9	medium	-----		3	8
6 inches,---	28.27	$\frac{1}{2}$ inch	31.9	$\frac{3}{4}$ inch strong	.44	17	3	
4 inches,---	12.56	$\frac{7}{16}$ inch	21.	medium	-----		2	8
3 inches,---	7.06	$\frac{3}{8}$ inch	12.4	$\frac{5}{8}$ inch strong	.30	68	2	8
				medium	-----		2	4
				$\frac{1}{2}$ inch strong	.19	63	1	12
				medium	-----		1	4

